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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Admiral	Chassis 20Y4B, BF, C, E, EF, F, FF, J, L, LA, LF, LS, MS, NF, PRS, RF Tel. Rec.	316-2
Airline	GSE-5010A, -5013A, -5110A, -5113A Tel. Rec.	316-3
Brociner	Mark 10	316-4
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Magnavox	Chassis CR-712AA	316-9
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Packard	6480488, 6480489 Prod. Chg. Bul. 154	316-1
Philco	51-T1604 (Code 125), 51-T1606 (Code 125), 51-T1634 (Code 125) Tel. Rec. Prod. Chg. Bul. 154	316-1
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Roland	10XF2	316-13
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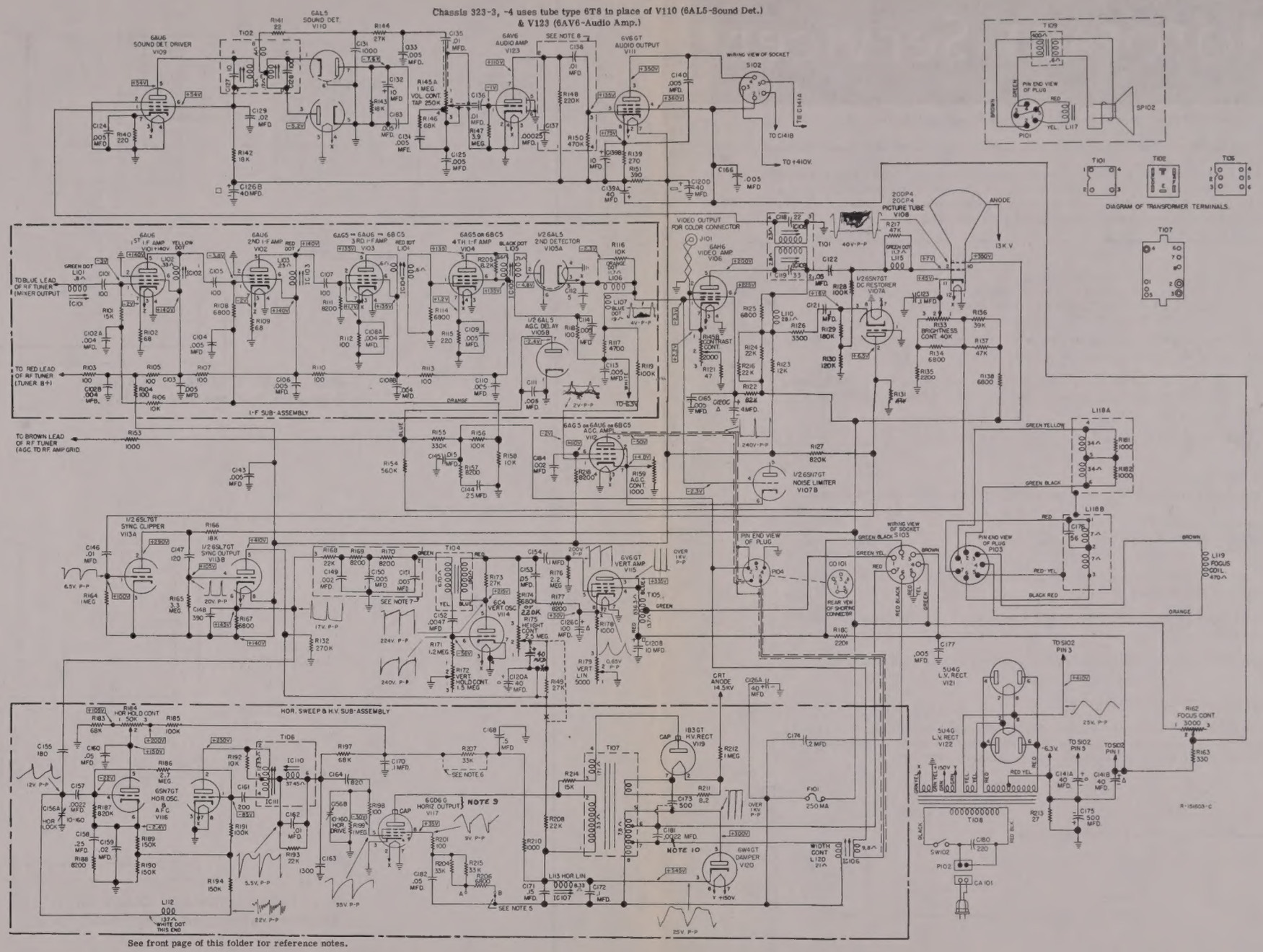
Zenith	X514V, W (Ch. 5X06), X519F, G, R, W (Ch. 5X07)	316-17
TRAV-LER	517-521-106-107-112 Ch. 520A5	316-18S
Crosley	372-3-4-5-6	Special


Chassis 323-3, -4 uses tube type 6T8 in place of V110 (6AL5-Sound Det.) & V123 (6AV6-Audio Amp.)
I-F SUB-ASSEMBLY
HOR. SWEEP & H.V. SUB-ASSEMBLY
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PIN END VIEW OF PLUG
REAR VIEW OF 9-PRONG CONNECTOR
WIRING VIEW OF SOCKET
TO BLUE LEAD OF R.F. TUNER (MIXER OUTPUT)
TO RED LEAD OF R.F. TUNER (TUNER B+)
TO BROWN LEAD OF R.F. TUNER (AGC TO R.F. AMP GRID)
VIDEO OUTPUT FOR COLOR CONNECTOR
ANODE
13 K.V.
NOTE 9
NOTE 10
SEE NOTE 5
SEE NOTE 6
SEE NOTE 7
SEE NOTE 8

See front page of this folder for reference notes.

Crosley Chassis 323-3, -4, -6

Schematic Diagram Courtesy Crosley Corporation

The PHOTOFACT Servicer

Vol. 32. Nos. 315 & 316 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ April 1, 1956

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.

CROSLEY MODELS
20CDC1, 20CDC2, 20CDC3 (Ch. 323-3, 323-4), S20CDC1, S20CDC2, S20CDC3 (Ch. 323-6)

THE REFERENCE NOTES LISTED BELOW PERTAIN TO THOSE NOTES INDICATED ON THE MAIN SCHEMATIC DIAGRAM IN THIS FOLDER

1. All voltages measured with an electronic volt-meter connected from socket lug to chassis. Controls set to obtain a normal picture. Voltages may vary, depending upon the setting of the various controls.

2. Supply voltage 117V. 60 cycle AC.

3. K = 1000

4. All capacitance values in mmf. & all resistance values in ohms unless otherwise noted.

5. Screen voltage adjustment for V117
   Nominal — Terminal B
   High — Terminal A

6. Some sets are equipped with a bare wire shunting R207. If horizontal drive is excessive, remove the bare wire across R207.

7. In some receivers, C149, C150, C151, R168, R169, & R170 are a resistor-capacitor unit, (Part No. W-149878).

8. In some receivers C137, C138, R148 & R150 are a resistor-capacitor unit (Part No. W-149881).

9. Some sets are equipped with two 6BQ6 tubes.

10. Some sets have a 190 mmf. capacitor connected from terminal 6 to terminal 8 of T107. When it is necessary to replace this capacitor use a 2200 mmf., 1000 volt, molded paper capacitor (Part No. 39477-54). Connect it between terminals 6 and 7 of T107.

← MAIN SCHEMATIC

RF TUNER SCHEMATICS →

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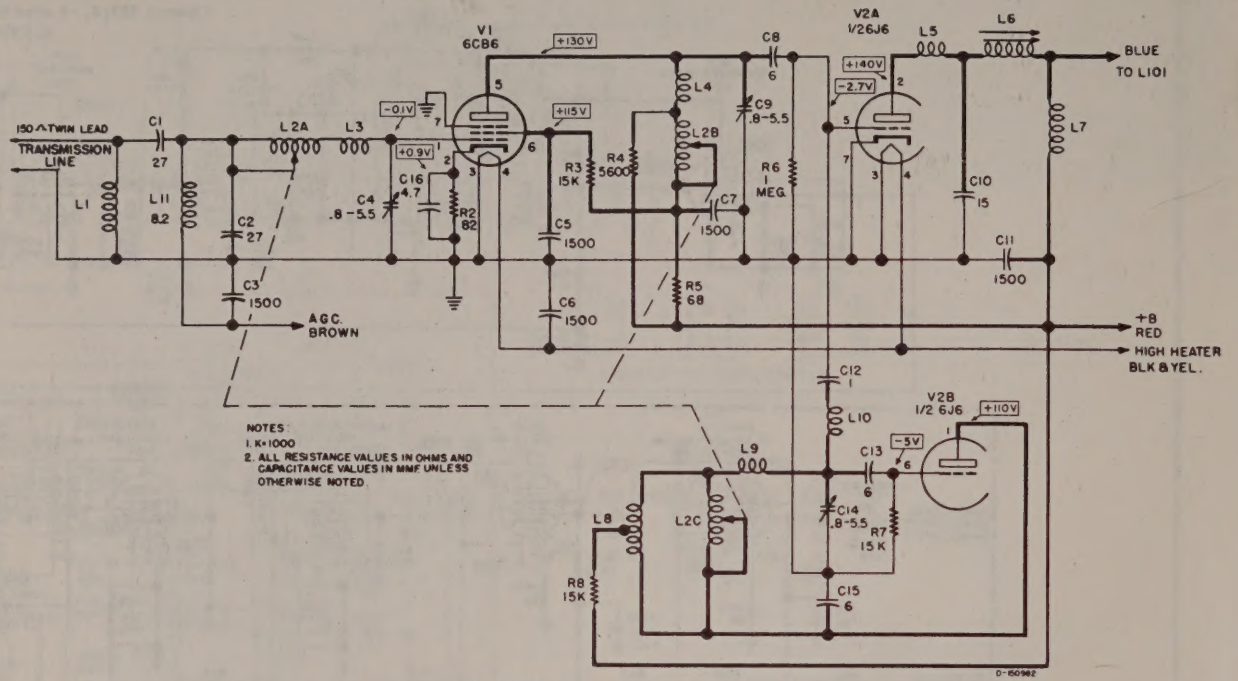
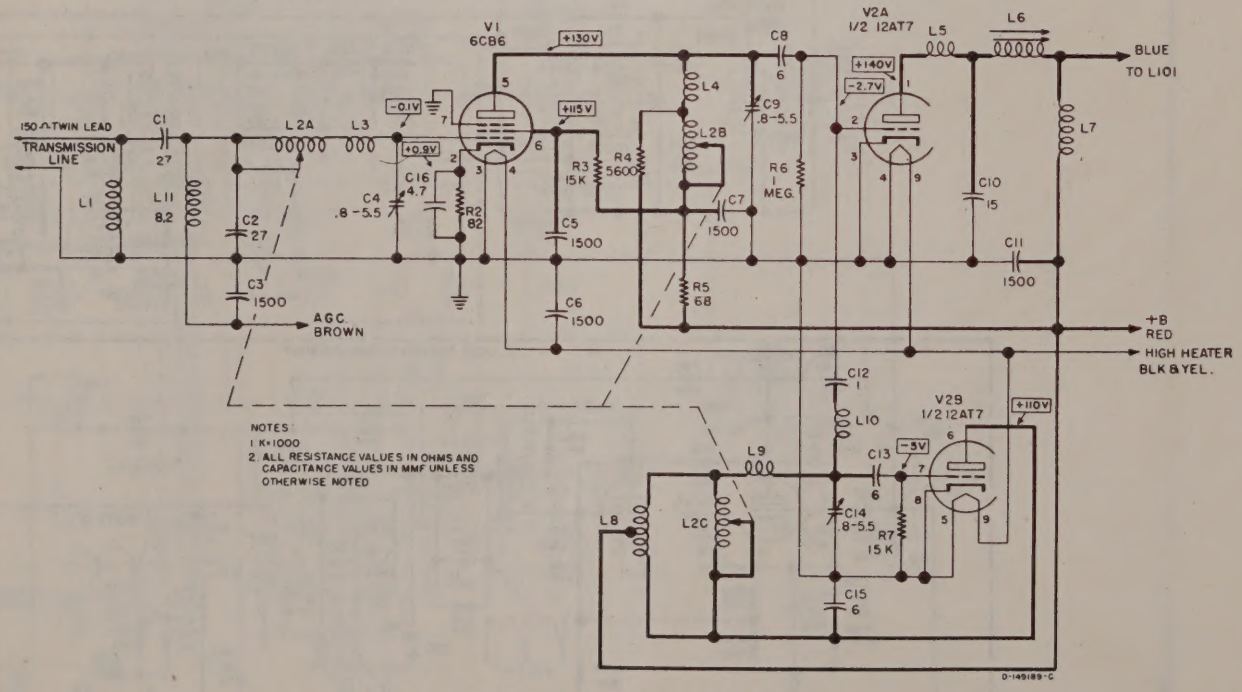


R. F. TUNER SCHEMATIC DIAGRAM
(Models Equipped with 6J6 tube)



R. F. TUNER SCHEMATIC DIAGRAM
(Models Equipped with 12AT7 tube)

Schematic Diagram Courtesy Crosley Corp.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 12 IN SET 282

PONTIAC MODEL 988568

Pontiac Model 984961 was covered in Photofact Folder 12 — Set 282.

Model 988568 (for all 1956 Pontiac cars) is electrically identical except for the following changes.

V3 changed from a 12BA6 to a 12AU6.

C5 is decreased from 47MMF to 39MMF.

R19 is increased from 27KΩ to 47KΩ, 1 watt.

Dial backplate changed to part #7267033.

Dial glass changed to part #7266930.

Escutcheon assembly changed to part #7266927.

Pushbutton and Slide assembly changed to part #1220874.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 6 IN SET 299

PACKARD MODELS 6480488, 6480489

Packard models 472047 and 472048 were covered in Photofact Folder 6 — Set 299.

Models 6480488 and 6480489 (for 1956 Packard cars) are electrically identical except for the following changes.

V3 changed from a 12BA6 to a 12AU6.

R11 is increased from 150Ω to 270Ω.

R26 and R27 may be increased from 220KΩ to 330KΩ.

R26 and R27 are omitted in some models.

T1, Vibrator Transformer, changed to part #6067.

Pointer Assy. (Model 6480488) changed to part #7267692.

Pointer Assy. (Model 6480489) changed to part #7267660.

Dial (Model 6480488) changed to part #7267696.

Dial (Model 6480489) changed to part #7267663.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 110

PHILCO MODELS 51-T1604, 51-T1606, 51-T1634 (Code 125)

Philco models 50-T1600, 50-T1632 and 50-T1633 (Code 122) were covered in Photofact Folder 10 — Set 110.

Models 51-T1604, 51-T1606 and 51-T1634 (Code 125) are electrically identical to the models covered except for the following changes.

V14 and V16 changed to type 7N7 tubes.

R88 is increased from 2.7KΩ to 6.8KΩ.

R85 is increased from 6.8KΩ to 15KΩ, 2 watts.

R89 is increased from 4.7KΩ to 10KΩ.

C81 is disconnected from the junction of R85 and R86 and reconnected to the plate of the sync phase inverter (pin 5 of V14).

R87 is omitted.

PRODUCTION CHANGES
BULLETIN 154

PRODUCTION CHANGES
BULLETIN 154

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PHOTOFACT* Folder

*TRADE MARK

ADMIRAL CHASSIS 20Y4B, BF, C, E, EF, F, FF, J, L, LA, LF, LS, MS, NF, PRS, RF

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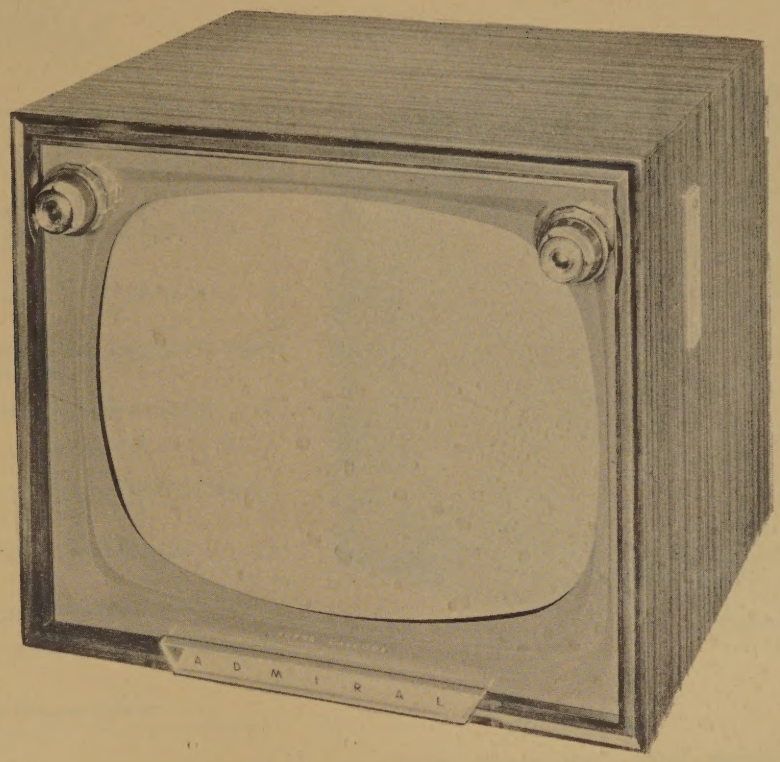
The contents for this envelope will be found among the last folders in this complete set of folders . . . unless it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



ADMIRAL MODEL T23B6N (Cn. 20Y4LS)

TRADE NAME	Admiral	MODELS	CHASSIS
		T23B16, T23B17, T23B18	20Y4B, 20Y4BF
		C23B16, C23B17, C23B18, C23B26, C23B27, F23B6, F23B7	20Y4E, 20Y4EF
		C23B1, C23B2, C23B3	20Y4E, 20Y4NF
		C25B6, C25B7, C25B8, C25B16, C25B17, C25B18, F25B6, F25B7, T25B26, T25B27	20Y4F, 20Y4FF
		T23B26, T23B27	20Y4L, 20Y4LF
		T23B6, T23B6N, T23B7	20Y4L, 20Y4LS
		T23B1, T23B2	20Y4L, 20Y4MS
		T23B1A	20Y4LA
		C223R6, C223R7, C223R8, C223R9, C223R16, C223R17, C223R18, T223R1, T223R2, T223R3	20Y4RF, 20Y4PRS 20Y4C 20Y4J

MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.52 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 25.75MC, Sound IF 21.25MC (Intercarrier)

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ADMIRAL CHASSIS 20Y4B, BF, C, E, EF, F, FF, J, L, LA, LF, LS, MS, NF, PRS, RF

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PHOTOFACT* Folder
*TRADE MARK

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.

2. Remove 10 wood screws. Remove rear cover.

3. Remove on/off/volume and contrast control assembly by compressing control assembly mounting spring and pulling control assembly straight back.

4. Remove 2 wood screws holding control escutcheon at side of cabinet.

5. Remove 2 metal screws holding side control mounting bracket and lay bracket to one side.

6. Remove 2 wood screws. Remove antenna bracket.

7. Remove 2 wood screws. Remove interlock bracket.

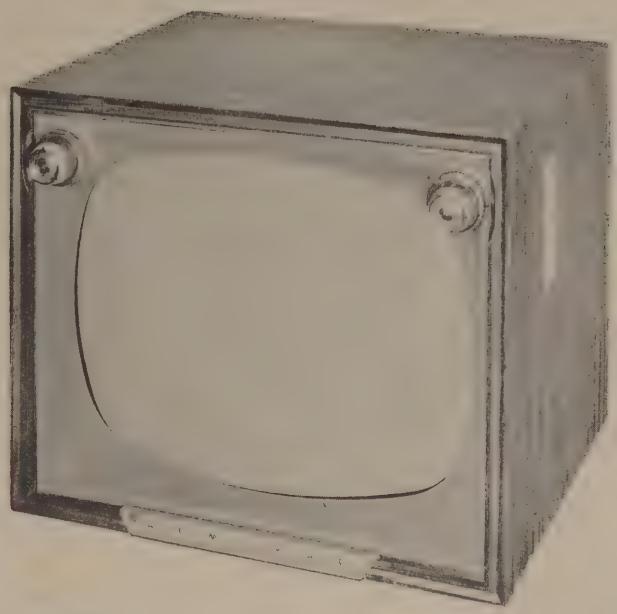
8. Disconnect speaker plug, HV lead, picture tube socket and yoke plug.

9. Remove 12 wood screws from 3 corner braces. Remove braces.

10. Remove 1 bolt from top mounting brace.

11. Remove 4 chassis bolts. Remove chassis by sliding straight out the cabinet.

12. Remove 2 metal screws. Remove speaker.



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CHASSIS

20Y4B, 20Y4BF, 20Y4C, 20Y4E, 20Y4EF, 20Y4F, 20Y4FF, 20Y4J, 20Y4L, 20Y4LA, 20Y4LF, 20Y4LS, 20Y4MS, 20Y4NF, 20Y4PRS, 20Y4RF

ADMIRAL CHASSIS 20Y4B, BF, C, E, EF, F, FF, J, L, LA, LF, LS, MS, NF, PRS, RF

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet below and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 4 push-on type control knobs. Remove 4 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit may be made by adjusting the flexible shaft at the back of set. Turn the horizontal adjustment slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate "Sound IF Detector Buzz" adjust the ratio detector secondary (L21) located on rear of chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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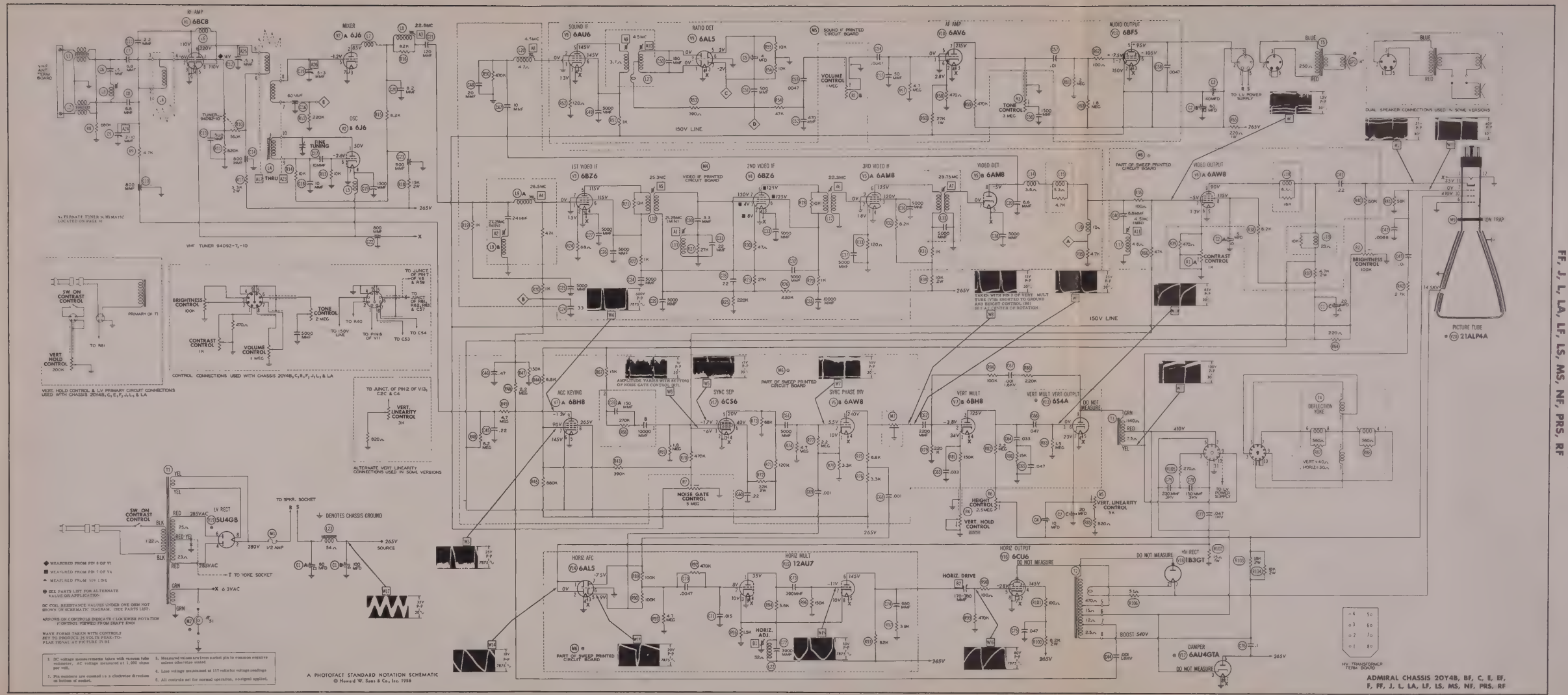
G315

DATE 5-56 SET 316 FOLDER 2



ADMIRAL CHASSIS 20Y4B, BF, C, E, EF, F, FF, J, L, LA, LF, LS, MS, NF, PRS, RF

PRODUCTION CHANGES

	During production the following production changes were made. These production changes may be identified by "Run Numbers". Whenever possible the reason for the change is also given. Run numbers 3 thru 13 were not assigned to any particular chassis. Chassis 20Y4EF, 20Y4FF, 20Y4LF, 20Y4LS, 20Y4MS and 20Y4NF were stamped Run 17 at the beginning of production and includes all modifications made in previous run changes.
	There are several different combinations of controls used in these chassis. R1, VOLUME AND CONTRAST CONTROL Part number 75B11-28 used in chassis 20Y4E, 20Y4EF, 20Y4F, 20Y4FF, 20Y4L, 20Y4LA, 20Y4LF, 20Y4LS, 20Y4MS and 20Y4NF. Part number 75B11-21 used in chassis 20Y4B, 20Y4BF, 20Y4C, 20Y4E, 20Y4F, 20Y4J and 20Y4L. Part number 75B11-29 may be used in late production versions of chassis 20Y4B, 20Y4E, 20Y4EF, 20Y4F, 20Y4FF, 20Y4L, 20Y4LF, 20Y4LS, 20Y4MS and 20Y4NF. Part number 75B29-2 used in chassis 20Y4PRS and 20Y4RF (Run 24).
	R2, BRIGHTNESS CONTROL Part number 75C13-53 used in chassis with side mounted controls. Part number 75C13-62 used in chassis with front mounted controls.
	R3, TONE CONTROL Part number 75C13-67 used in chassis with side mounted controls. Part number 75C13-64 used in chassis with front mounted controls. The tone control, R3, is omitted in chassis 20Y4LA and may, or may not be used in all other chassis versions.
	R4, VERTICAL HOLD CONTROL Part number 75C13-65 used in chassis with side mounted controls. Part number 75C13-63 used in chassis with front mounted controls.
RUN 2	TO CENTER THE RANGE OF VERTICAL HOLD CONTROL R81 is increased from 120KΩ to 150KΩ.
Run 14	TO IMPROVE SIGNAL TO NOISE RATIO R48 is decreased from 15Meg to 8.2Meg. R19, 1KΩ, added to improve noise immunity.
Run 15	TO IMPROVE AGC ACTION C45 is increased from .1MFD to .22MFD.
Run 16	B+ OVERLOAD PROTECTION M1, ½ Amp., slo-blo, 3AG fuse added into circuit. Early models used a ½ amp. 8AG fuse.
Run 17	TO PREVENT ARCING To prevent arcing the high voltage center tap lead of T1 (red-yellow lead) is removed from the yoke socket and connected directly to chassis.
Run 18	TO INCREASE HIGH FREQUENCY RESPONSE C56 is decreased from 5000MMF to 1500MMF. In later production C56 is increased to 2200MMF.
Run 19	TO MAKE PRINTED BOARDS UNIVERSAL The sync board is changed to part #A4868-2. IF board changed to A4861-3. A 6.8KΩ resistor is added from R32 to the junction of R31 and R34.
	TO PREVENT BREAKDOWN OF C4. R103 is increased from 5.6KΩ to 18KΩ, 2 watts. R104, 18KΩ, 2 watts is added in parallel with R103.

PRODUCTION CHANGES (cont)

To compensate for loss of height due to the decreased boost voltage R82 is decreased from 2.7Meg to 2.2Meg.

TO EXTEND AUDIO RESPONSE

R1, volume control may be tapped (part #75B11-29). A 22KΩ resistor and a .033MMF capacitor are connected in series between the tap on the volume control and chassis ground.

A 3.3Meg resistor is added from pin 7 of V10 to pin 7 of V11.

C58 is increased from 4700MMF to .01MFD.

C56 is increased from 1500MMF to 2200MMF.

R61 is decreased from 2Meg to 1Meg.

R63 is decreased from 1.6Meg to 820KΩ.

COMPONENT CHANGES

R18 is decreased from 18KΩ to 470Ω in some versions.

R24 is decreased from 68Ω to 56Ω in some versions.

R21 is decreased from 13KΩ to 4.7KΩ in chassis 20Y4RF and 20Y4PRS.

R32 is decreased from 8.2KΩ to 1.2KΩ when in Run 19 the printed boards are made universal by adding a 6.8KΩ resistor.

R40 is decreased from 150KΩ to 120KΩ in chassis 20Y4B, 20Y4C and 20Y4J. In later versions R40 is increased to 180KΩ.

R39 is increased from 470Ω to 1000Ω in chassis 20Y4B, 20Y4C and 20Y4J.

R69 is increased from 1.8Meg to 3.3Meg in chassis 20Y4B, 20Y4C and 20Y4J.

R83 is increased from 1.5Meg to 2.2Meg in chassis 20Y4E, 20Y4F and 20Y4L.

R103 is decreased from 18KΩ to 4.7KΩ, 2 watts in chassis 20Y4B, 20Y4C, 20Y4E, 20Y4F, 20Y4J and 20Y4L.

R106 is decreased from 5.1Ω to 4.7Ω in some versions.

R45 is omitted in chassis 20Y4B, 20Y4C and 20Y4J.

A 470KΩ resistor connected from one side of the AC line to ground is used in early production receivers only.

C52 is increased from 470MMF to 2200MMF in chassis 20Y4B, 20Y4C, 20Y4E, 20Y4F, 20Y4J and 20Y4L (Run 1).

C56 is decreased from 1500MMF to 1000MMF in some versions .

A .0047MFD capacitor connected from pin 6 of V15 to B2 (horizontal drive trimmer) may be used in some versions.

In early versions C24 and C46 are replaced by a 1MFD capacitor.

C24 may be increased from .33MFD to .47MFD.

C5 in chassis 20Y4B, 20Y4C, 20Y4J and 20Y4LA (Run 1) the replacement part number is given as 67B27-3.

PICTURE TUBES

A 21ALP4A picture tube is used in models C23B1, C23B2, C23B3, C23B16, C23B17, C23B18, C23B26, C23B27, F23B6, F23B7, T23B1, T23B1A, T23B2, T23B6, T23B6N, T23B7, T23B16, T23B17, T23B18, T23B26 and T23B27.

A 24DP4A picture tube is used in models C25B6, C25B7, C25B8, C25B16, C25B17, C25B18, F25B6, F25B7, T25B26 and T25B27.

T2, HORIZONTAL OUTPUT TRANSFORMER

Horizontal output transformer (part #79D43-2) may be used in some versions.

T4, DEFLECTION YOKE

Deflection yoke (part #94D87-8 including R87, R88 and plug #88A18-3) may be used in some versions.

SPEAKERS

Speaker 78B105-1 (includes audio output transformer, T5) is used in models T23B1, T23B2, T23B6, T23B7, T23B16, T23B17, T23B18, T23B26 and T23B27.

Speaker 78C108-1 (includes audio output transformer, T5) is used in models C23B1, C23B2, C23B3, C23B16, C23B17, C23B18, C23B26, C23B27, C25B6, C25B7, T25B26 and T25B27.

CONTINUED ON PAGE 9

PRODUCTION CHANGES (cont)

Speaker 78C107-1 (includes audio output transformer, T5), 78C107-2 (does not include audio output transformer) is used in models F25B6 and F25B7.

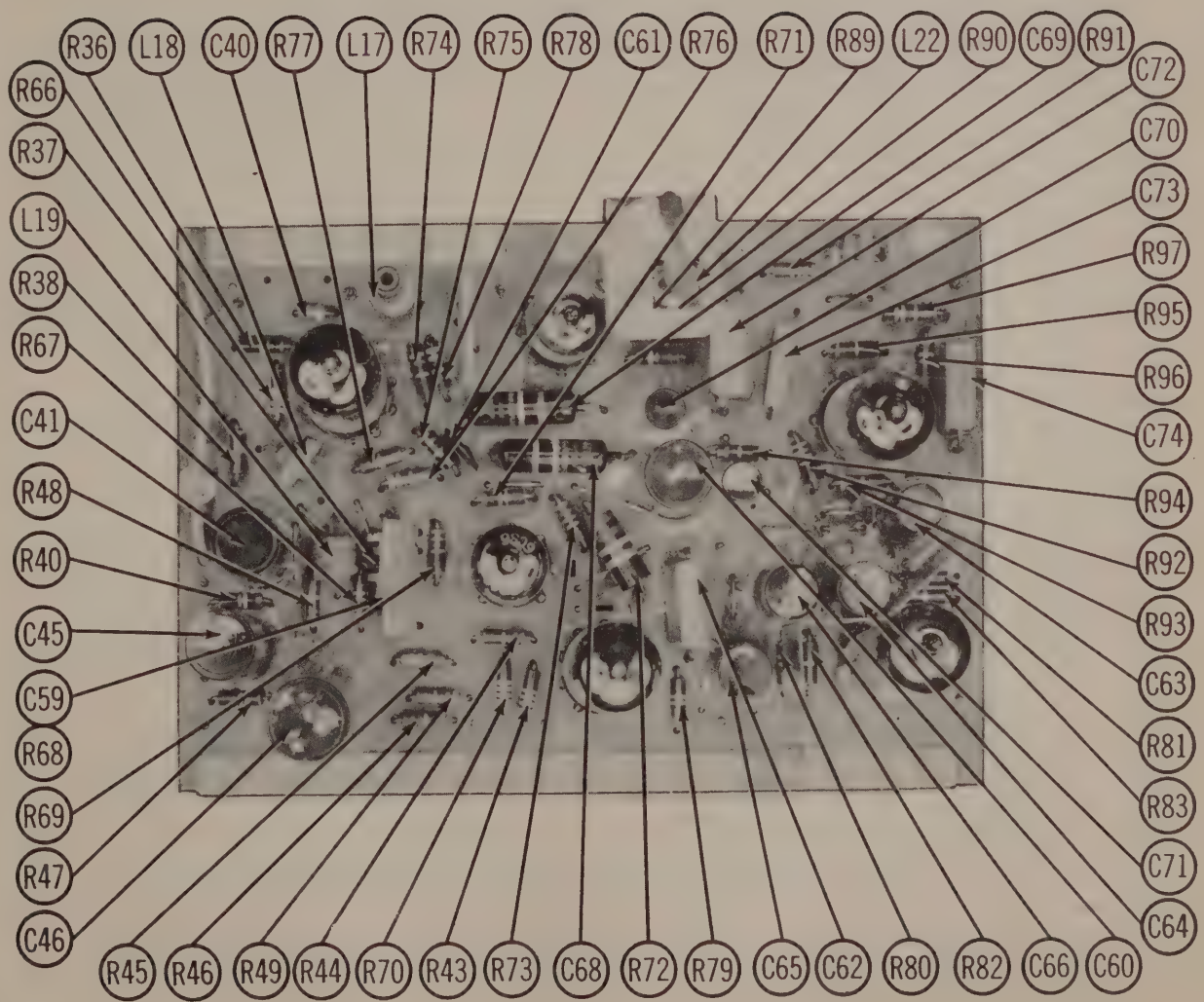
Speaker 78B106-1 (includes audio output transformer, T5) is used in models F23B6 and F23B7.

Speaker 78C116-2 (includes audio output transformer, T5) is used in models T223R1, T223R2 and T223R3.

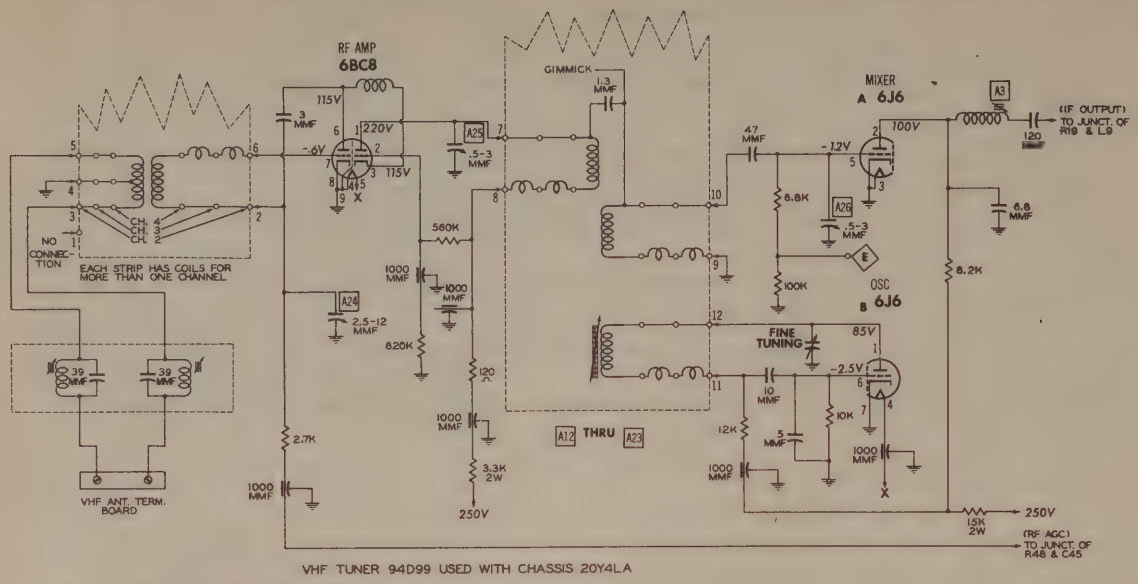
Speaker 78C115-1 (does not include audio output transformer, T5) is used in models T223R1, T223R2 and T223R3.

Speaker 78D118-1 (may or may not include audio output transformer, T5) is used in models C223R6, C223R7, C223R8 and C223R9.

Speaker 78C103-3 (includes audio output transformer, T5) is used in models C223R16, C223R17 and C223R18.



SYNC CIRCUIT SUB-CHASSIS



VHF TUNER 94D99 USED WITH CHASSIS 20Y4LA

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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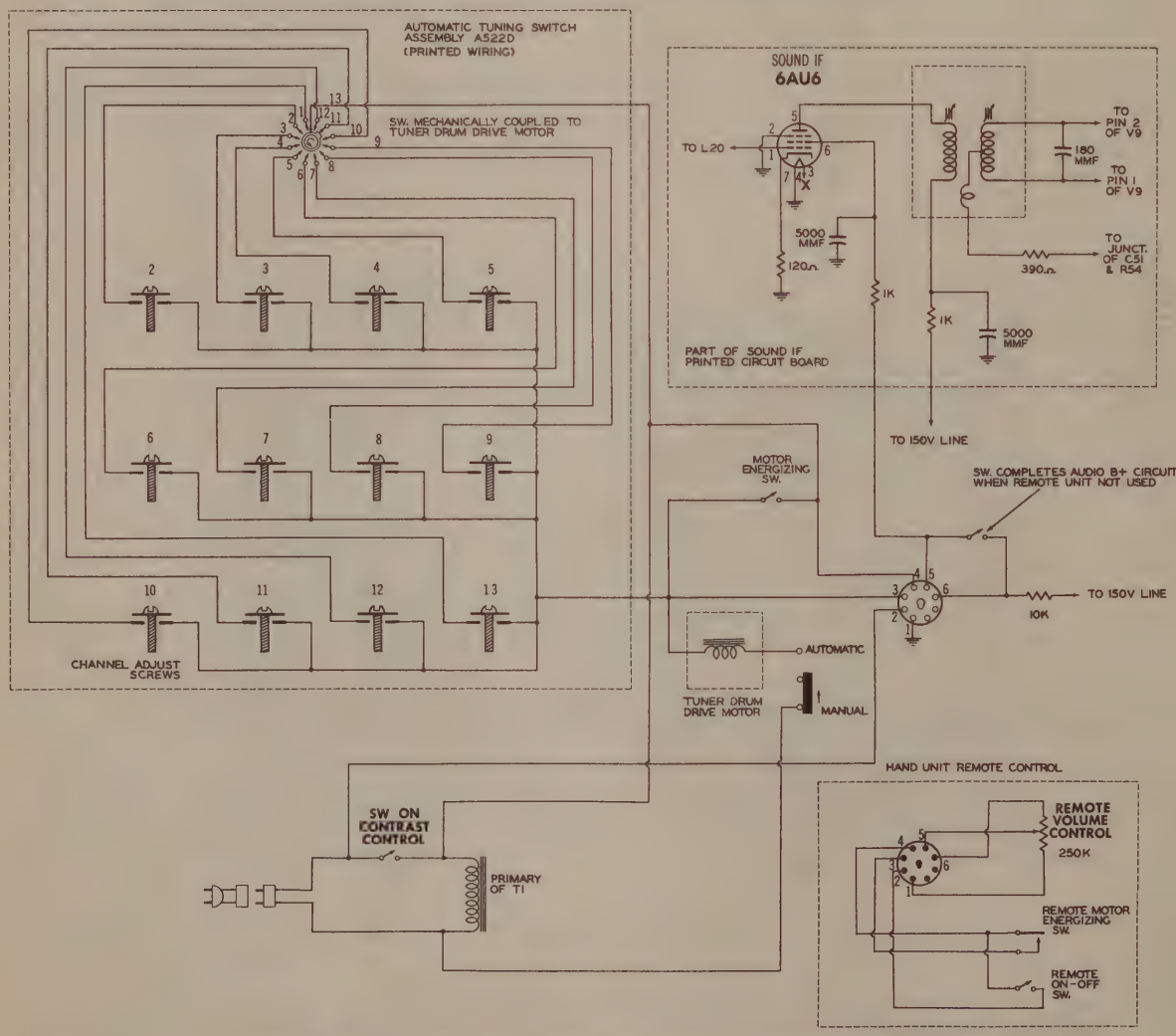
ALTERNATE VHF TUNER SCHEMATIC



REMOTE CONTROL UNIT AND SOUND IF CIRCUIT USED WITH CHASSIS 20Y4RF, AND PRS

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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REMOTE CONTROL AND SOUND IF CIRCUIT

CHASSIS TOP VIEW

ADMIRAL CHASSIS 20Y4B, BF, C, E, EF, F,
FF, J, L, LA, LF, LS, MS, NF, PRS, RF

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BC8	6BC8	
V2	Mixer-Oscillator	6J6	6J6	
V3	1st. Video IF Amplifier	6BZ6	6BZ6	
V4	2nd. Video IF Amplifier	6BZ6	6BZ6	
V5	3rd. Video IF Amplifier-Video Detector	6AM6	6AM6	
V6	Video Output-Sync Phase Inverter	6AW6	6AW6	
V7	AGC Keying-Vert. Mult.	6BZ6	6BZ6	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Ratio Detector	6AL5	6AL5	
V10	AF Amplifier	6AV6	6AV6	
V11	Audio Output	6BF5	6BF5	
V12	Sync Separator-Sync Inverter-Vert. Mult.-Vert. Output	6CS6	6CS6	
V13	Horiz. AFC	6BA6	6BA6	6B4 may be used as an alternate
V14	Horiz. Osc.	6AL5	6AL5	
V15	Horiz. Output	1BA7T	1BA7T	
V16	Horiz. Output	6CU6	6CU6	
V17	Damper	6AU6GTA	6AU6GTA	6AU6GT may be used as an alternate
V18	HV Rectifier	1B3GT	1B3GT	
V19	LV Rectifier	5U4GB	5U4GA	5U4GA may be used as an alternate

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: ADMIRAL PART No	CBS	GENERAL ELECTRIC	SYLVANIA	NOTES
V20	21ALP4A ①	21ALP4A ①	21ALP4A ①	21ALP4A ①	① Aluminized
		21ALP4B ①	21ALP4A/B ①	21ALP4B ①	② Silver screen "SS"
		21ALP4	21ALP4	21ALP4	
	24DP4A	24DP4A ②	24DP4A ②	24DP4	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	350	67D15-105	B4C633		FP356	TM-3030	Q-321.5	R3056 *
B	100	350				TC68	TD-30-350	MT-2830	
C	120	200							
C2A	45	200	67D15-109			FP317.8	TM-3123	T-090	R1652 *
B	80	200				TC502K		MT-2504	
C	20	50							
C3	40	200	67A4-R1	PRS250V40	BR4035	TC58	TD-40-350	FM-3540	TVA-1511
C4	10	475	67A4-R2	PRS500V10	BR3150	TC52	TD-10-475	MT-4710	TVA-1803
C5	4	50	67A4-9	5RR50V5	BR550	TC30	TD-4-50	MMT-0505	TVA-1303

* Unit must be ordered from Mfgr.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	1.5		94D48-54	NPO-D21.5	TCZ-1R5	Z004	NPOA-1R5	ZT-5515	5TCC-B-V15	
C7	6.8		94D47-53	NPO-D26.8	TCZ-6R8	Z012	NPOA-6R8	ZT-5568	5TCC-B-V68	
C8	5.6		94D47-53	NPO-D56.8	TCZ-5R6	Z012	NPOA-5R6	ZT-5568	5TCC-B-V68	
C9	5-10		94D62-71		839-10					
C10	900		94D62-70							
C11	3.3		94D62-75	NPO-D3.3	TCZ-3R3	Z006	NPOA-3R3		5TCCB-V32	
C12	5-5		94D62-72		839-3		3115-01-025	CT565A		
C13	1500		94D62-76		BPD-0615	DD-153	K071	901-0615	DC-5315	5HK-D15
C14	900		94D62-70							
C15	5-5		94D62-72		839-3		3115-01-025	CT565A		
C16	60		94D62-76							
C17	60									
C18	10									
C19	1500				BPD-0615	DD-152	K071	901-0615	DC-5315	5HK-D15
C20	3.3		94D62-74	NPO-D3.3			Z015	NPOA-3R3		
C21	120		65C5-52	BPD-0001S	DD-121		G044	911-121	UC-5312	5GA-T12
C22	900		94D62-70							
C23	900		94D62-70							
C24	.33	400		P488N-33						
C25	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C26	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C27	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C28	.33	400	64B16-51	P488N-22		CUD4P22		PT4023	47M-P23	
C29	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D5	
C30	5.6		65C43-2	NPO-S15.6	TCZ-5R6	TZ06	NPOA-5R6		5TCCB-V33	
C31	33		65C6-12	NPO-S233	TCZ-32	TZ14	NPOK-330		5TCC-Q33	
C32	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D5	
C33	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C34	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C35	10000		65C43-3	BPD-01	DD-103	K101	811-01	DC-511	5HK-S1	
C36	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C37	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C38	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D6	
C39	5.6		65B26-068	NPO-S15.6	TCZ-5R6	TZ06	NPOA-5R6	ZT-5568	5TCCB-V56	
C40	5.6		65B26-068	NPO-S15.6	TCZ-5R6	TZ06	NPOA-5R6	ZT-5568	5TCCB-V56	
C41	.33	400	64B16-28	P488N-22		CUD4P22		PT4023	47M-P22	
C42	.0068	600	64B9-14	S15500	D6-683	CUB6D68	611-0068		67M-D68	
C43	.01	600	64B9-10	BPZ-01	DD-103	CUB6S1	GP3-333-103	PT611	67M-S1	
C44	.001	1600	64A2-38	BVD-30-1000	DD50-102	CUB1KD1	3KV-102	PT1521	MB-D1	
C45	.33	200	64B16-51	P488N-23		CUB2P23		PT54023	27M-P23	
C46	.47	200	64B16-49	P488N-47		CUB2P47			27M-P47	
C47	10		65C6-44	NPO-S10	TCZ-10	TZ09	NPOA-100	ZT-561	5TCC-Q1	
C48	30		65C6-2	NPO-S30	TCZ-30	TZ13	NPOK-300	ZT-563	5TCC-Q3	
C49	5000		65D10-5	BPD-005	DD-502	K060	811-005	DC-535	5HK-D5	
C50	250		65D10-3							
C51	500		65C13-3	S1500	D6-501	TP47	GP3K-501	UC-5345	5GA-T5	
C52	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C53	.0047	400	64B16-38	S16700	D6-472	CUB6D47	GP3-333-472	PT54247	67M-D47	
C54	.0047	400	64B16-38	S16700	D6-472	CUB6D47	GP3-333-472	PT54247	67M-D47	
C55	50		65C6-4	S150	D5-500	TP30	GP1K-500	UC-545	5GA-Q5	
C56	1500			BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C57	.01	600	64B16-36	BPD-01	D6-103	CUB6S1	GP3-333-103	PT5611	67M-S1	
C58	.0047	600		S16700	D6-472	CUB6D47	GP3-333-472	UC-5347	5GA-T47	
C59A	150		76SC9-9	S1150	D5-151	TP26	911-151	UC-5315	5GA-T15	
B	10000			BPD-01	DD-103	K062	911-01	DC-511	5HK-S1	
C60	33	300	64B16-51	P288N-33		CUB3P23		PT56023	37M-P23	
C61	5000		65C43-1	BPD-005	DD-502	K060	811-005	DC-535	5HK-D5	
C62	2200	500	65B21-232	1464-0022		LN5D23			MS-223	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C63	.033	200	64B16-56	BPD-03	DP-303	CUB3S3			67M-S33	
C64	.033	600	64B16-10	BPD-03	DP-303	CUB6S3			67M-S33	
C65	.047	400	64B16-33	BPD-05	DP-503	CUB4S7		PT54147	47M-S47	
C66	.047	600	64B16-9	BPD-05	DP-503	CUB6S47			67M-S47	
C67	.001	1600	64A2-35	BVD-30-1000	DD50-102	CUB1KD1	3KV-102	PT1521	MB-D1	
C68	.001	600	64B21-1	S1000	D6-102	CUB6D1	GP3L-102	PT521	67M-D1	
C69	.001	600	64B21-1	S1000	D6-102	CUB6D1	GP3L-102	PT521	67M-D1	
C70	.0047	400	64B16-38	S16700	D6-472	CUB4D47	GP3-333-472	PT54247	67M-D47	
C71	.015	200	64B16-59	BPD-015	DD16-153	CUB2S15			27M-S15	
C72	3900	500	65B21-392	1464-0039		LN5D39		MC3463	MS-339	
C73	390	500	65B21-391	1464-00039	D6-391	S16739	811-391	MC3543	MS-339	
C74	680	500	65B21-681	1464-00068	D6-681	LR5T68	811-681		MS-368	
C75	.047	600	64B9-9	BPD-05	DP-503	CUB6S47		PT6147	67M-S47	
C76	.1	600	64B8-7	P668N-1	DP-104	CUB6P1		PT2601	67M-P1	
C77	.047	1000	64A2-30	P1068-047		CUB5S47		PT1615	10TM-S47	
C78	150	3000	65D10-58	BVD-30-150	DD30-151	V3715	3KV-151		30GA-T15	
C79	250	3000	65D10-59							

† Items C52A, C59B, R68 are combined in one unit.
See Production Changes on pages

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω		75B11-28	F1-5	RTV-552	* QJ-884	UE648	Contrast (Panel)
B	1Meg			R2-54				Volume (Rear)
C	Switch			K1-1				Attach to R1A.
R1A	1000Ω		75B11-31	F1-5	RTV-396	**QJ-397	UF12R	Contrast (Panel)
B	1Meg			R2-53			UR16A	Volume (Rear)
C	Switch			K1-1			UR-38	Attach to R1A.
R1A	1000Ω		75B11-29	F1-5		eQJ-898	UF12R	Contrast (Panel)
B	1Meg			R2-51			UR16-T1253	Volume Tapped at 100K (Rear)
C	Switch			K1-1			UR-38	Attach to R1A.
R2A	100KΩ	½	75C13-53	AB-40	A47-100K-3	QU-138	U-41	Brightness
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R2A.
R3A	2Meg	½	75C13-57	AB-76	A47-2Meg-2	QU3-139	U-56	Tone
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R3A.
R4A	200KΩ	½	75C13-55	AB-46	A47-200K-3	QU-135	U-43	Vertical Hold
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R4A.
R5A	3000Ω	½	75C20-7	AB-6	A47-3000-3	QU-113	U-5	Vertical Linearity
B	Shaft		Not Req.	AK-1	FK8-J	RQ	Not Req.	Attach to R5A.
R6A	2.5Meg	½	75C30-1	BK-35	A47-2.5Meg-3	QU-139	SU-546	Height
B	Shaft		Not Req.	Not Req.	FK8-J	RQ	Not Req.	Attach to R6A.
R7A	5Meg	½	75C30-28	AB-37	A47-5Meg-3	QU-141	TA85L	Noise Gate
B	Shaft		Not Req.	AK-1	FK8-J	RQ	Not Req.	

* Concentrikit Equivalent; K-7 Kit, Base Elements and Shafts; B17-108 & P17-200 (Panel) B13-137 & R2-318 (Rear) 78-1 (Switch)

**Concentrikit Equivalent; K-3 Kit, Base Elements and Shafts; B17-108 & P17-126 (Panel) B13-137 & R2-312 (Rear) 78-1 (Switch)

◆ Concentrikit Equivalent; K-7 Kit, Base Elements and Shafts; B17-108 & P17-200 (Panel) B18-137K & R2-318 (Rear) 78-1 (Switch)

† Universal Replacement Mallory Exact Duplicate Part No. UE573
See Production Changes on pages

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	NOTES
R8	680KΩ	½	60B8-684	BTS-680K	
R9	100Ω	½	60B8-672	BTS-4700	
R10	560KΩ	½	60B8-564	BTS-560K	
R11	820KΩ	½	60B8-824	BTS-820K	
R12	220KΩ	½	60B8-224	BTS-220K	
R13	10KΩ	½	60B8-103	BTS-10K	
R14	10KΩ	½	60B8-103	BTS-10K	
R15	820Ω	½	60B8-822	BTS-820	
R16	82KΩ	½	60B8-823	BTS-82K	
R17	330Ω	½	60B30-332	BTS-330	
R18	15KΩ	2	60B20-153	BTS-15K	
R19	100Ω	½	60C36-102	BTS-1000	
R20	100Ω	½	60C36-102	BTS-1000	
R21	13KΩ 5%	½	60C37-133		
R22	100Ω	½	60C36-102	BTS-1000	
R23	27KΩ	½	60C36-273	BTS-27K	
R24	68Ω	½		BTS-68	
R25	330KΩ	½	60C36-334	BTS-330K	
R26	220KΩ	½	60C36-224	BTS-220K	
R27	27KΩ	½	60C36-273		
R28	10KΩ 5%	½	60C37-103		
R29	1000Ω	½	60C36-102	BTS-1000	
R30	47Ω	½	60C41-470	BTS-47	
R31	1000Ω	½	60C36-102	BTS-1000	
R32	820KΩ	½	60C36-824	BTS-820K	
R33	1.5MΩ	½	60C36-131	BTS-150	
R34	10KΩ	2	60C30-103	BTS-10K	
R35	470Ω	½	60C36-472	BTS-4700	
R36	100Ω	½	60C36-101	BTS-100	
R37	470Ω	2	60B20-472	BTS-4700	
R38	8200Ω	½	60C36-823	BTS-8200	
R39	47Ω	½	60B8-471	BTS-470	
R40	150KΩ	½	60C36-154	BTS-150K	
R41	56KΩ	½	60B8-563	BTS-56K	
R42	3.7KΩ	½	60B8-372	BTS-3700	
R43	390KΩ	½	60C36-394	BTS-390K	
R44	6800Ω	½	60C36-682	BTS-6800	
R45	820KΩ	½	60B8-824	BTS-820K	
R46	2.2Meg	½	60C36-225	BTS-2.2Meg	
R47	150KΩ	½	60C36-154	BTS-150K	
R48	5.6Meg	½	60C36-825	BTS-5.6Meg	
R49	4.7Meg	½	60C36-475	BTS-4.7Meg	
R50	470KΩ	½	60B8-474	BTS-470K	
R51	1000Ω	½	60B8-102	BTS-1000	
R52	120Ω	½	60B8-121	BTS-120	
R53	330Ω	½	60B8-331	BTS-330	
R54	47KΩ	½	60B8-473	BTS-47K	
R55	10KΩ	½	60B8-103	BTS-10K	
R56	10KΩ	½	60B8-103	BTS-10K	
R57	4.7Meg	½	60B8-475	BTS-4.7Meg	

† Items R68, C59A, C59B are combined in one unit.
See Production Changes on pages

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	NOTES
R58	470Ω	½	60B8-471	BTS-470	
R59	470KΩ	½	60B8-474	BTS-470K	
R60	27KΩ	1	60B14-273	BTA-27K	
R61	2Meg 5%	½	60B7-206	BTS-2Meg 5%	
R62	100Ω	½	60B8-101	BTS-100	
R63	1.6Meg 5%	½	60B7-165	BTS-1.6Meg 5%	
R64	220Ω	½	60B8-221	BTS-220	
R65	220Ω	1	60B14-221	BTA-220	
R66	47KΩ	½	60C36-473	BTS-47K	
R67	15KΩ	½	60C36-153	BTS-15K	
R68	270KΩ	½	†68C9-1	BTS-270K	
R69	1.8Meg	½	60C36-185	BTS-1.8Meg	
R70	470KΩ	½	60C36-474	BTS-470K	
R71	120KΩ	½	60C36-124	BTS-120K	
R72	332Ω	½	60B0-333	BTS-32X	
R73	68KΩ	½	60C36-683	BTS-68K	
R74	4.7Meg	½	60C36-475	BTS-4.7Meg	
R75	68000 5%	½	60C36-683	BTS-6800 5%	
R76	330Ω	½	60C36-332	BTS-3300	
R77	2.2Meg	½	60C36-225	BTS-2.2Meg	
R78	330Ω	½	60C36-332	BTS-3300	
R79	220KΩ	½	60C36-224	BTS-220K	
R80	15KΩ	½	60C36-153	BTS-15K	
R81	150KΩ	½	60C36-154	BTS-150K	
R82	2.2Meg	½	60C36-225	BTS-2.2Meg	
R83	1.5Meg	½	60C36-155	BTS-1.5Meg	
R84	100KΩ	½	60B8-104	BTS-100K	
R85	820Ω	½	60B8-821	BTS-820	
R86	220KΩ	½	60B8-224	BTS-220K	
R87	56Ω	½	60B8-561		
R88	560Ω	½	60B8-561		
R89	100KΩ 5%	½	60C37-104		
R90	100KΩ 5%	½	60C37-104		
R91	82KΩ	½	60C36-823		
R92	470KΩ	½	60C36-474		
R93	4.7Meg	½	60C36-475		
R94	5600Ω	½	60C36-562		
R95	150KΩ	½	60C36-154	BTS-1500	
R96	150KΩ	½	60C36-154		
R97	3900Ω	½	60C36-392		
R98	100Ω	½	60B8-101		
R99	470KΩ	½	60B8-474		
R100	8200Ω	½	60B20-822		
R101	100Ω	½	60B8-101		
R102	15Ω	1	60B28-53		
R103	18KΩ	2	60B30-183	BTS-18K	
R104	18KΩ	2	60B30-183	BTS-18K	
R105	270Ω	½	60B8-271	BTS-270	
R106	5.1Ω 5%			BWI-5.1	

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	117VAC	550VCT	5V	6.3V						
		@ 1.52A	@ 240A	@ 3A	@ 10A		PV733	P2636 ①	P8334 ②	28H33 ①	R-61BC ③

1. Tape low HV winding . Tape 5V @ 2A winding parallel & phase 6.3V winding.
2. Parallel & phase 6.3V winding.
3. Parallel & phase 6.3V @ 5A windings. Tape 6.3V @ 1.2A winding.
4. Tape 6.3V @ 1.2A winding. Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T2	Horiz. Output Trans.	76Z85-3	HVG-54*						
T3	Vert. Output Trans.	79B43-4	A-2624 ②						
T4A	Yoke(90°) Horiz. (15.75KC)	94D87-10 ③	DF807 ③	MDF-92 ③	135Di ③	Y80F19/43 ③	DY-18 ③	Y-16 ③	Y-41-1 ③
B	Vert. (175HZ)								

① Use 15 to 1 turns ratio.
② Drill new mounting hole(s).
③ Cut and tape yellow lead.
④ Connect as auto transformer.
⑤ Includes resistors R87 and R88, also ping Admiral Part No. 86A18-3.
⑥ Use original horizontal damping network.
See Production Changes on pages

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	5	5	5	5	5	5
6	3	4	4	4	4	4	7
7	See Note ① 3	2	2	2	2	1	1
8	1	1	1	1	1	2	2
Special Notes →	② ②	③	③	③	③	③	③

① Replace capacitor C44 with approximately 25 to 50MMF 4KV (MINIMUM).
② Requires 2 turns for filament winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	NOTES
T5	2.7KΩ	3-4Ω	Part of 78J105-2	21001	A2228	A3876	22846	S-1X	

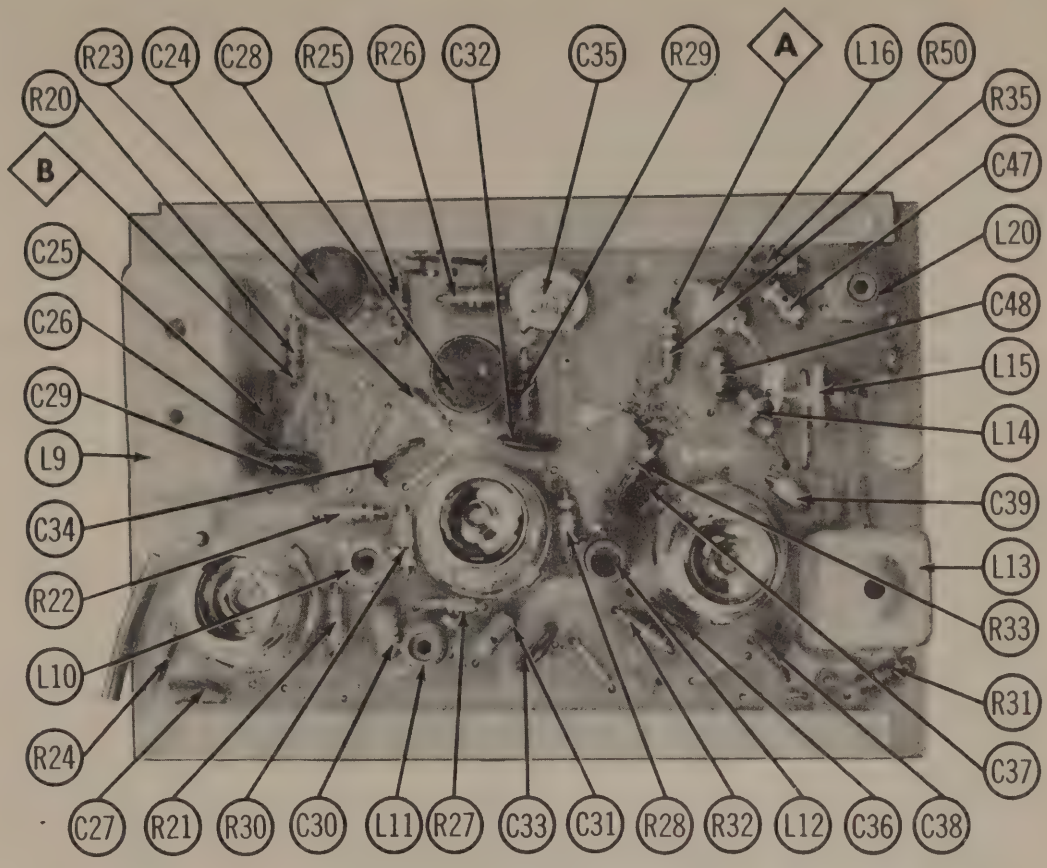
SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP	REPLACEMENT DATA: ADMIRAL PART No.	CHAM PART No.	RCA TYPE No	NOTES
SP1	4"	PM	3-4Ω	78B105-1	4A07	22351	
	6"x 9"	PM		78C108-1	69A2	23851	
	6"x 9"	PM		78C107-1	69A3	23821	
	8"x 9"	PM		78C107-2	69A2	23821	
	10"	PM		78B106-1	10A31	23661	
				78C105-1			
				78D105-1			
				78C103-2			

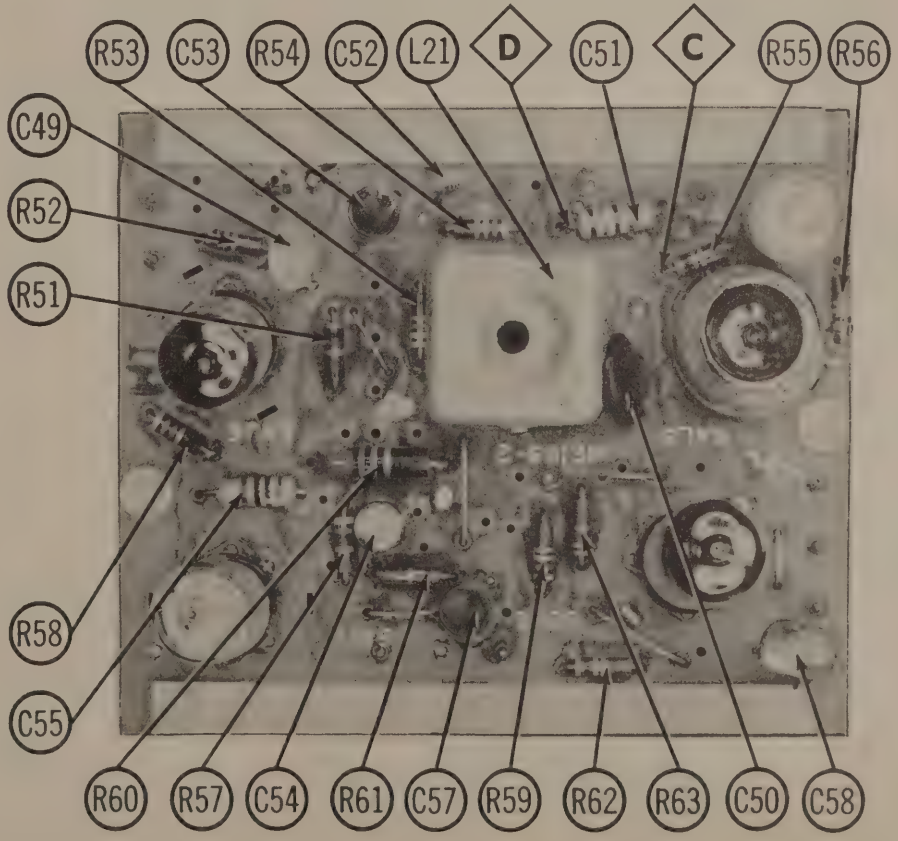
See Production Changes on page

COILS (RF-IF)

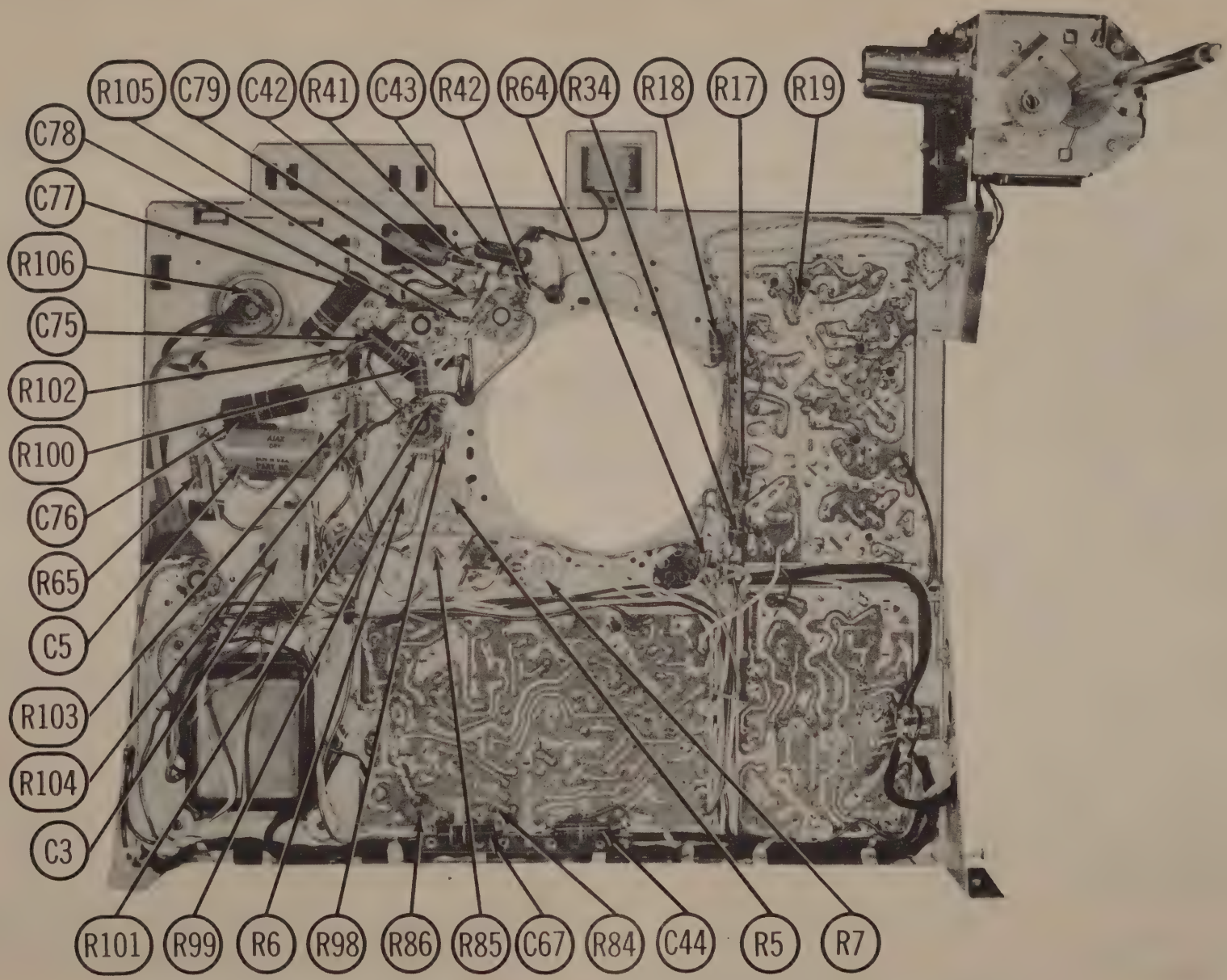
ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: ADMIRAL PART No.	MESSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω					
L2	Ant. Matching Trans.	0Ω	0Ω					
L3	IF Trap	.1Ω		94D92-67				
L4A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-53				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-53				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-54				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-55				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-56				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-57				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-58				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-59				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-60				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-61				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-62				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D62-63				Channel 13



VIDEO IF SUB-CHASSIS

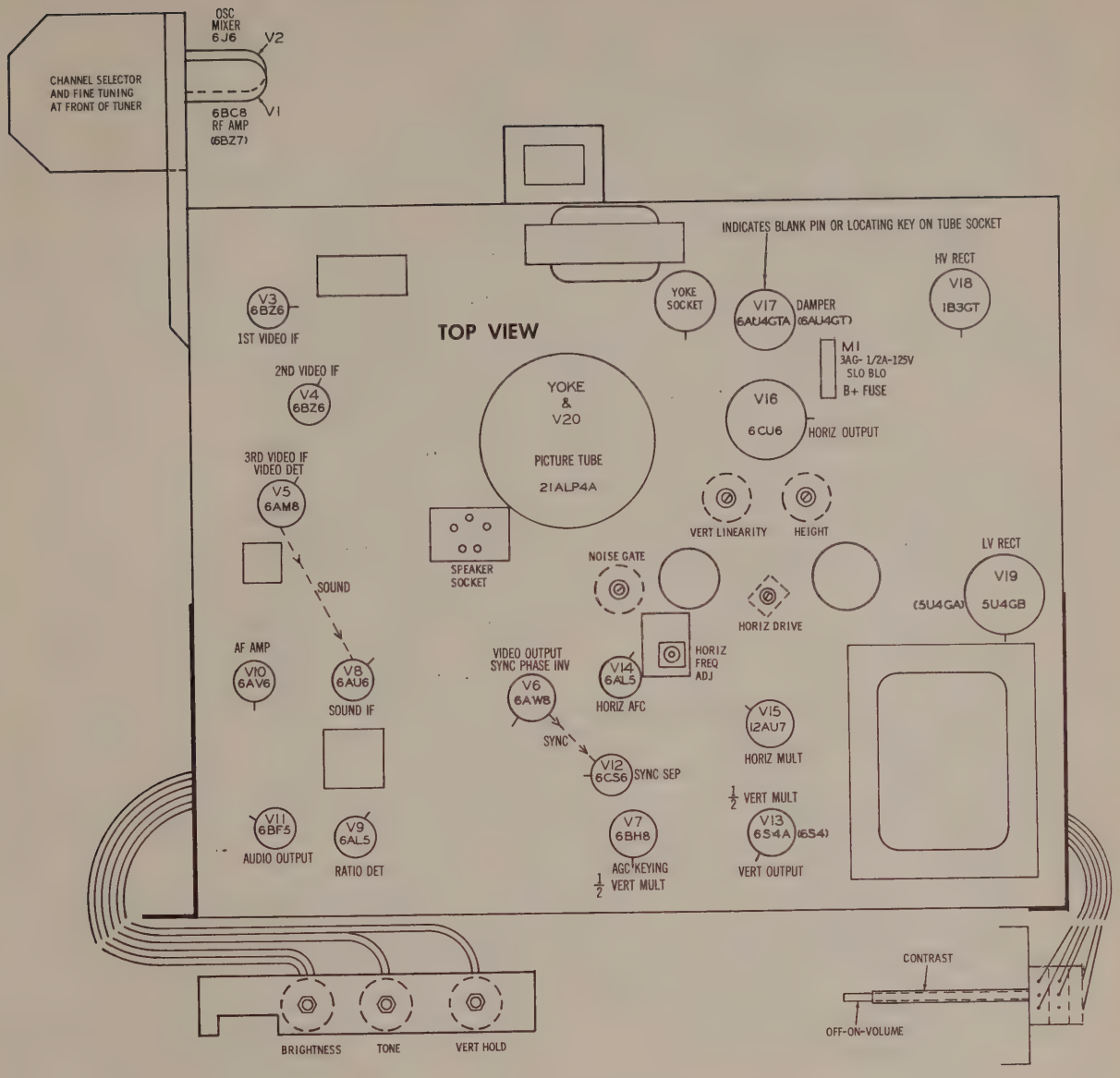


SOUND IF SUB-CHASSIS



CHASSIS BOTTOM VIEW

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V11**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V20**
Has pic, no sound - **V8, V9, V10, V11**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V6, V7, V13**
No horiz. sync - **V6, V14, V15**
No vert. or horiz. sync - **V6, V12**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20**
No vertical deflection - **V7, V13**
Poor vert. linearity or foldover - **V7, V13**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V6, V7, V13**
Horiz. off freq. - **V6, V14, V15**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage leads should be securely taped away from chassis.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 having pin 1 removed.
Disconnect antenna leads and short the antenna terminals with a short clip lead.
Set the contrast control to minimum contrast.
Connect the negative lead of a 3 volt bias battery to point (B). Connect positive to chassis.
Use only enough generator output to provide usable indication on the VTVM. (1 volt Maximum.)
Allow 15 to 20 minutes for test equipment and receiver warm-up period.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	21.25MC (10MC Swp)	Any unused high band channel	DC probe thru decoupling network (Fig. 1) to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	27.25MC	"	"	A2	"
3.	"	"	22.6MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	26.5MC	"	"	A4	"
5.	"	"	25.3MC	"	"	A5	"
6.	"	"	22.3MC	"	"	A6	"
7.	"	"	23.75MC	"	"	A7	"

OVERALL VIDEO IF RESPONSE CHECK

Leave bias connected as under "Video IF Alignment".
Use only enough sweep generator output to provide usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23MC (10MC Swp)	21.25MC 22MC 23MC 25MC 25.75MC	Any unused high band channel	Vert. Amp. thru decoupling network (Fig. 1) to point (A). Low side to chassis.		Check for response similar to Fig. 2. If necessary, retouch A1 thru A7 to obtain desired response. Adjust A4 and A5 for position of 25.75MC marker and amplitude of response curve on high frequency side. Adjust A3 and A6 for position of 22MC and 23MC markers and amplitude of response curve on low frequency side.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Disconnect antenna and short antenna terminals together.
Set contrast control for minimum contrast.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A8, A9	Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (D). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120v sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (C). Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A10	Reconnect C5. Adjust A10 so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Remove the bias battery and replace the original tuner oscillator tube in its socket. Tune in a TV station. Adjust A8 and A9 for maximum deflection with the VTVM connected as in step 9 of "Sound IF alignment using AM signal generator and VTVM". Adjust A10 for best program sound with minimum buzz. This point will be found between two maximum buzz peaks.

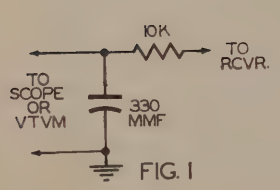


FIG. 1

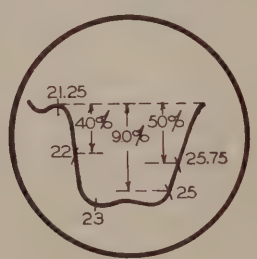


FIG. 2

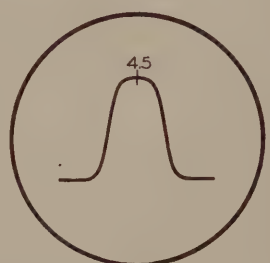


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

4.5MC TRAP ALIGNMENT

Short L15 with a short jumper wire.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓒ. Common to chassis.	All	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust All for minimum 4.5MC beat interference in picture.

OSCILLATOR ALIGNMENT

Replace original oscillator tube in its socket. The channel oscillator adjustment screws are reached through a hole to the left and just below the channel switch shaft. The correct adjustment screws are accessible through this hole as the channel switch is turned to each channel.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru decoupling network (Fig.1) to point Ⓐ. Low side to chassis.	A12	Adjust to place video marker at 50% as in Fig. 5. Sound marker should not exceed 5% on response curve.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

RF AND MIXER ALIGNMENT

Leave bias connected as under "Video IF Alignment". The bias supply may be removed if it is difficult to obtain a response of sufficient amplitude. Short to chassis the point where bias was connected.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point Ⓔ. Low side to chassis.	A24, A25, A26	Adjust for response similar to Fig. 6 with markers above 90%.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig.6. If markers fall below 70% on any channel, make SLIGHT compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

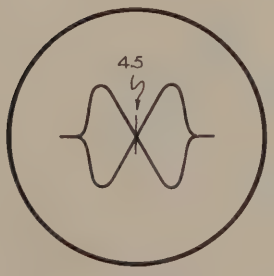


FIG. 4

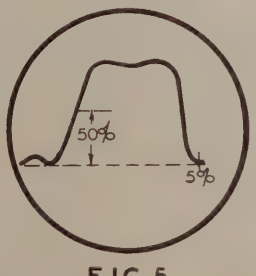


FIG.5

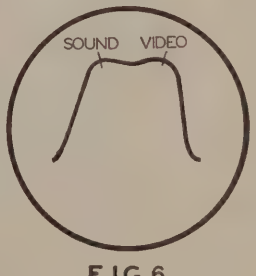
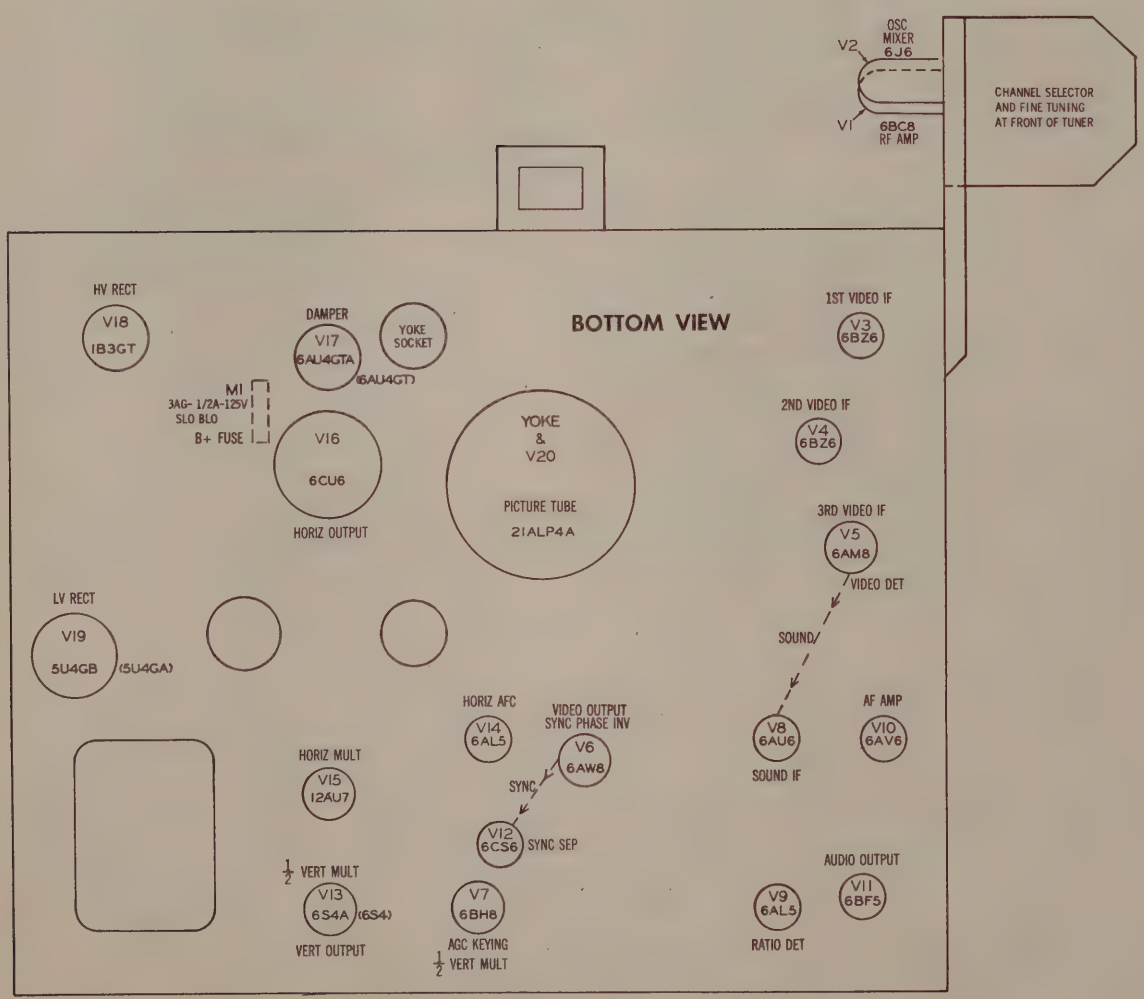


FIG.6

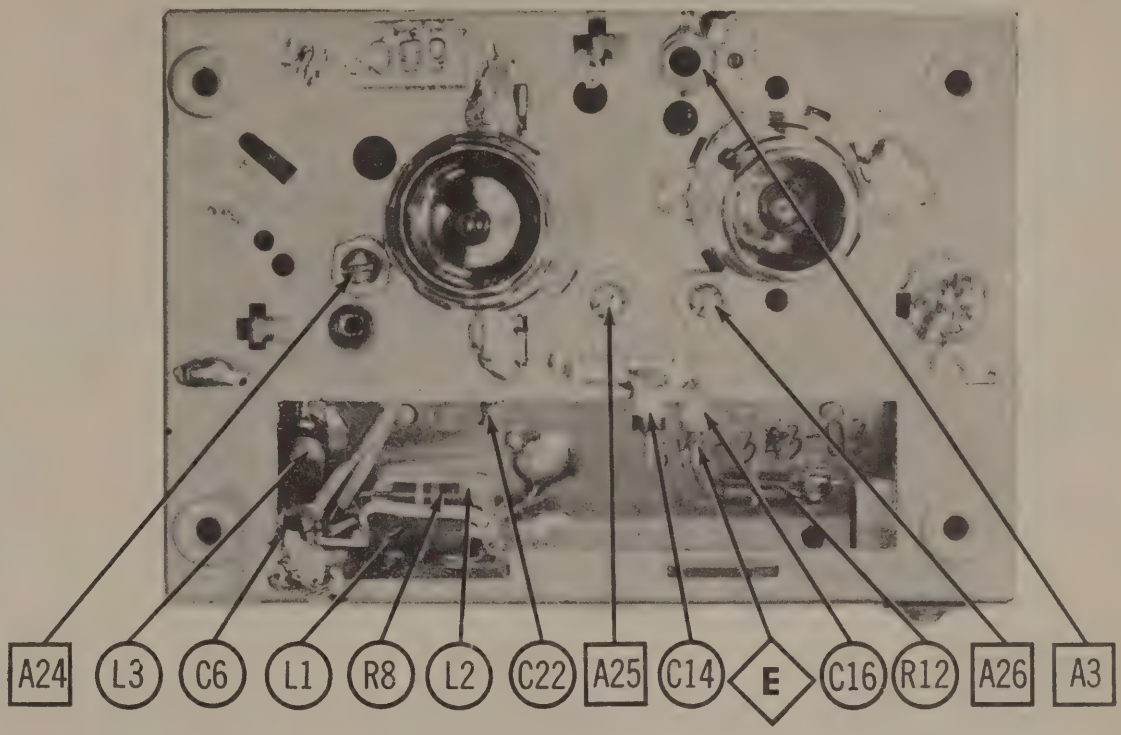
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC8	INF	3.5Meg	0Ω	0Ω	.1Ω	† 3.3KΩ	350KΩ	INF	0Ω
V 2	6J6	† 25KΩ	† 25KΩ	0Ω	.1Ω	220KΩ	10KΩ	0Ω		
V 3	6BZ6	150KΩ	68Ω	0Ω	.1Ω	▲ 1KΩ	▲ 1KΩ	0Ω		
V 4	6BZ6	100KΩ	▲ 47Ω	.1Ω	0Ω	† 1KΩ	† 1KΩ	130KΩ		
V 5	6AM8	120Ω	.4Ω	† 18KΩ	0Ω	.1Ω	† 11KΩ	.3Ω	4.7KΩ	0Ω
V 6	6AW8	3.3KΩ	1.5Meg	† 10KΩ	.1Ω	0Ω	65Ω	4.8KΩ	■ 8.5KΩ	■ 5KΩ
V 7	6BH8	250KΩ	220KΩ	◓ 2.2Meg	.1Ω	0Ω	■ 220Ω	■ 12KΩ	† 55Ω	2Meg
V 8	6AU6	470KΩ	0Ω	.1Ω	0Ω	■ 1KΩ	■ 1KΩ	120Ω		
V 9	6AL5	INF	INF	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 10	6AV6	4.7Meg	470Ω	.1Ω	0Ω	0Ω	0Ω	† 470KΩ		
V 11	6BF5	850KΩ	15KΩ	.1Ω	0Ω	† 550Ω	† 300Ω	850KΩ		
V 12	6CS6	50KΩ	0Ω	.1Ω	0Ω	■ 40KΩ	■ 22KΩ	1.8Meg		
V 13	6S4A	NC	1.5KΩ	1.5Meg	0Ω	.1Ω	1.5Meg	NC	NC	◓ 10KΩ
V 14	6AL5	15Ω	15Ω	.1Ω	0Ω	4.8Meg	0Ω	4.8Meg		
V 15	12AU7	† 5.6KΩ	5Meg	1.5KΩ	.1Ω	.1Ω	† 80KΩ	150KΩ	1.5KΩ	0Ω
V 16	6CU6	NC	.1Ω	TP	† 8.5KΩ	470KΩ	TP	0Ω	0Ω	TOP CAP ◓ 15Ω
V 17	6AU4GTA	NC	TP	400KΩ	NC	† 55Ω	NC	.1Ω	0Ω	
V 18	1B3GT	PINS 1-8 HAVE INF RESISTANCE								TOP CAP ◓ 485Ω
V 19	5U4GB	NC	100KΩ	NC	23Ω	NC	25Ω	NC	100KΩ	
V 20	21ALP4A	.1Ω	56KΩ	PIN 6 0Ω	PIN 10 ◓ 9KΩ	PIN 11 ■ 170KΩ	PIN 12 0Ω			

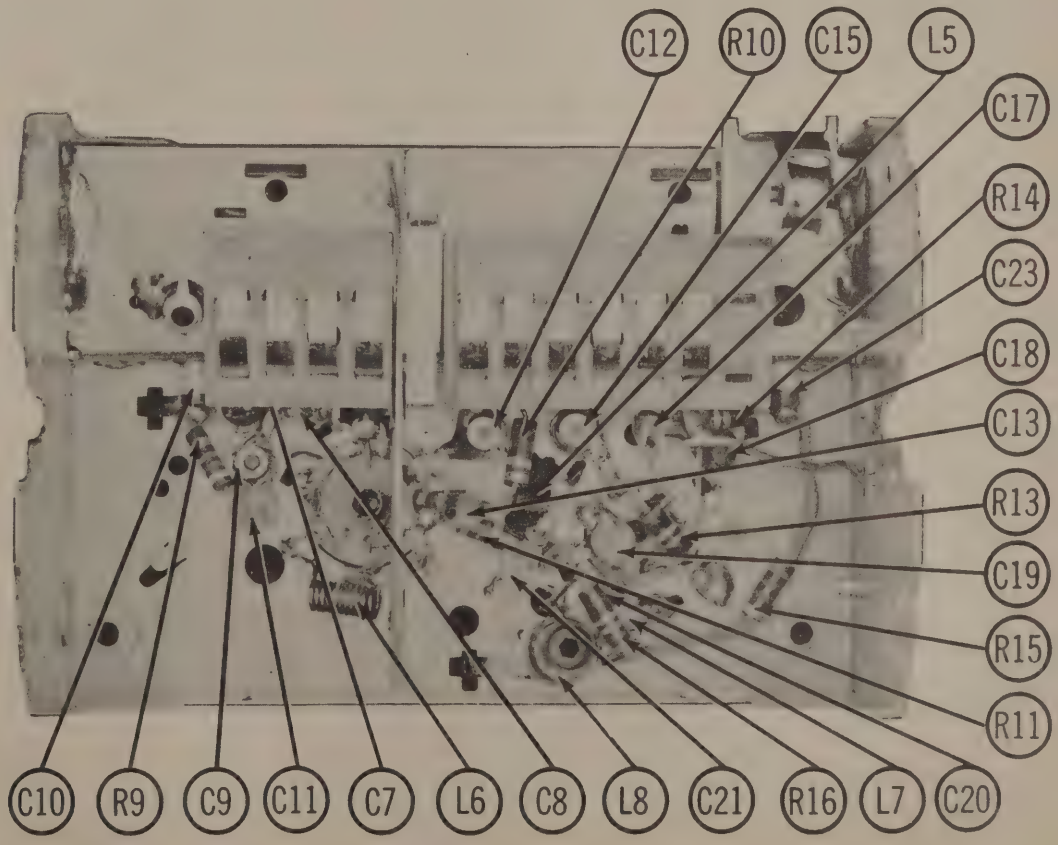
† MEASURED FROM PIN 2 OF V19.
▲ MEASURED FROM PIN 7 OF V4.
■ MEASURED FROM 150V LINE.
◓ MEASURED FROM PIN 3 OF V17.



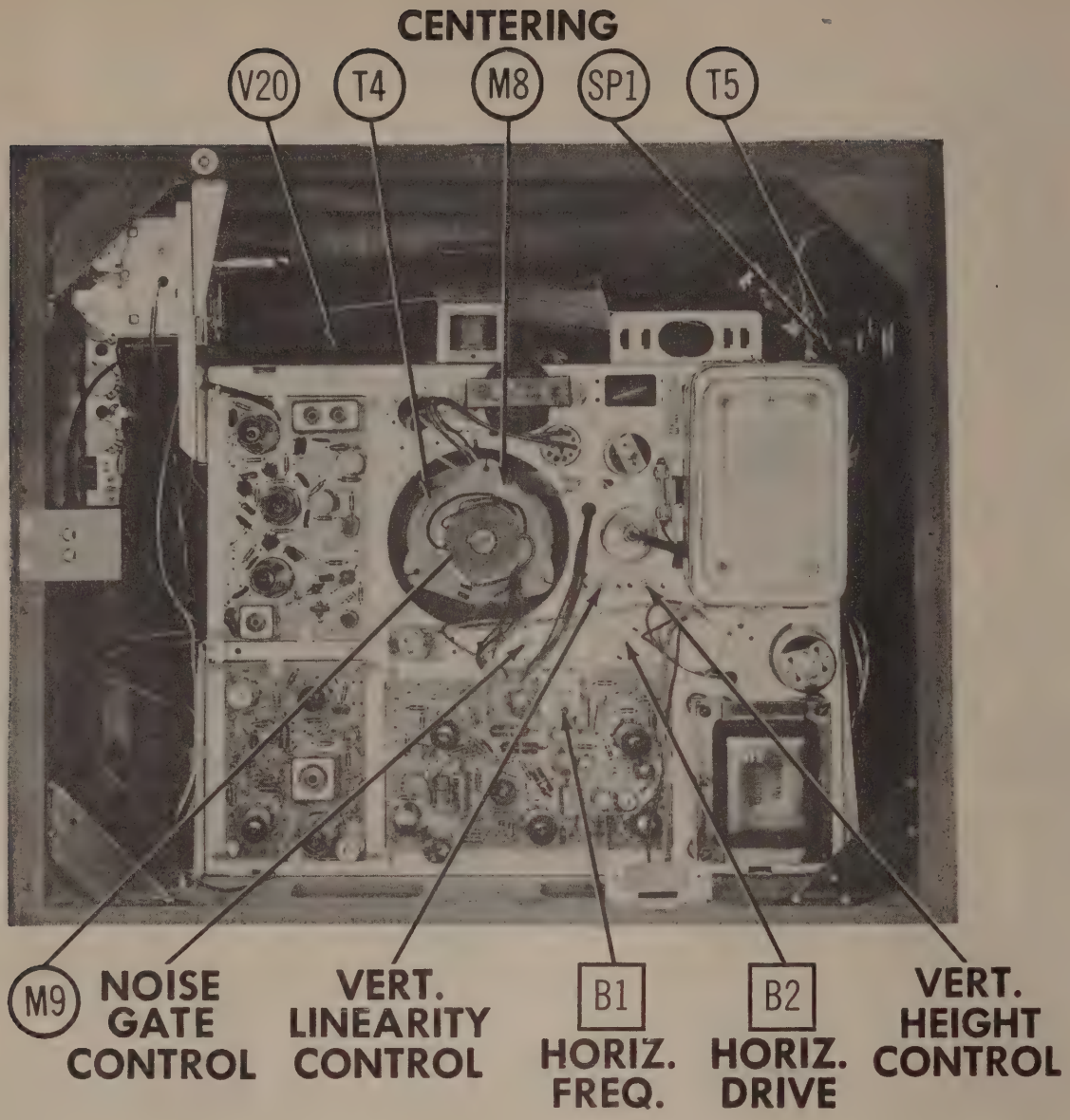
TUBE PLACEMENT CHART



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.

2. Set the brightness and contrast controls for a normal picture.

3. Rotate the horizontal adjustment slug (B1) clockwise until the picture loses sync. It may be necessary to momentarily switch off channel for picture to lose sync.

4. Turn B1 slowly counter clockwise until the picture just falls into sync.

5. Turn to an unused channel. If vertical white lines appear near the center of the screen, slowly adjust the horizontal drive trimmer (B2) counter clockwise until the white lines disappear.

6. If in step 5 the horizontal drive was adjusted, tune in a station and repeat steps 3 and 4. Check horizontal sync by switching off channel and back again.

PHOTOFACT* Folder

*TRADE MARK

AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A

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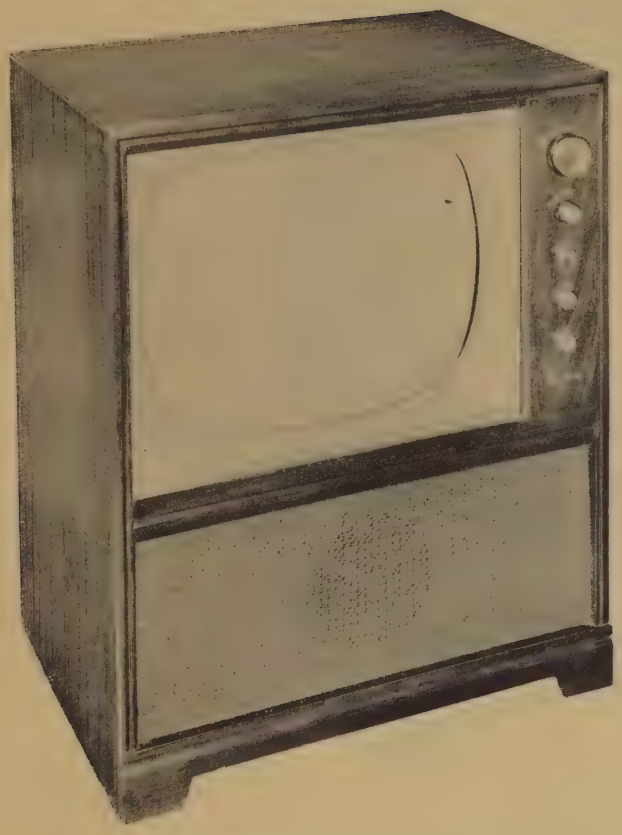

AIRLINE MODEL GSE-5010A

TRADE NAME	Airline Models GSE-5010A, GSE-5013A, GSE-5110A, GSE-5113A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.2 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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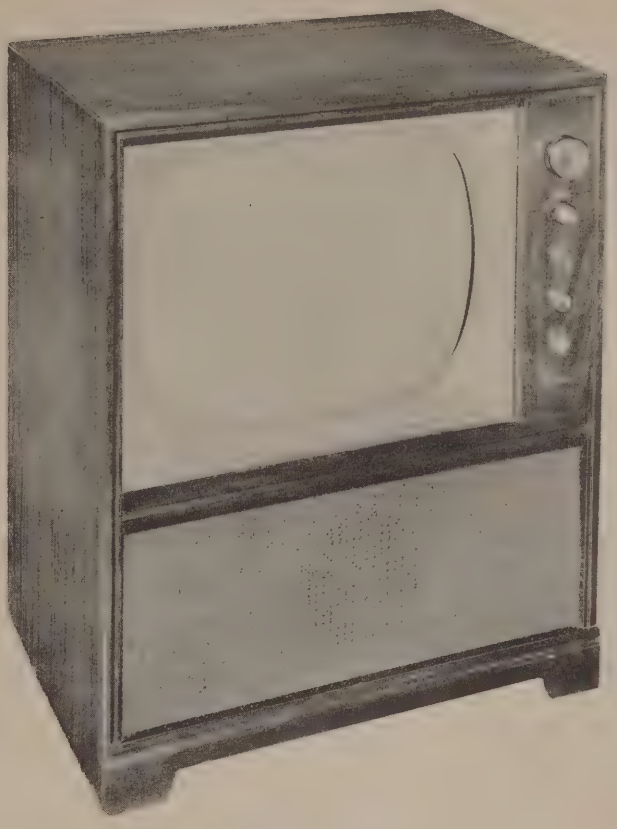
DATE 5-56 SET 316 FOLDER 3

PHOTOFACT* Folder
*TRADE MARK

AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A



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AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.

2. Remove 7 wood screws and 3 metal screws. Remove rear cover.

3. Disconnect yoke plugs picture tube socket, speaker leads and HV lead.

4. Remove 2 wood screws holding chassis mounting board to cabinet.

5. Slide chassis out to remove.

6. Remove 4 speaker nuts. Remove speaker.

MODELS

GSE-5010A, GSE-5013A, GSE-5110A, GSE-5113A

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet below and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 5 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Turn the set on and tune in a TV station. Turn the horizontal hold until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the set. Adjust the buzz control (R6) for maximum volume and MINIMUM buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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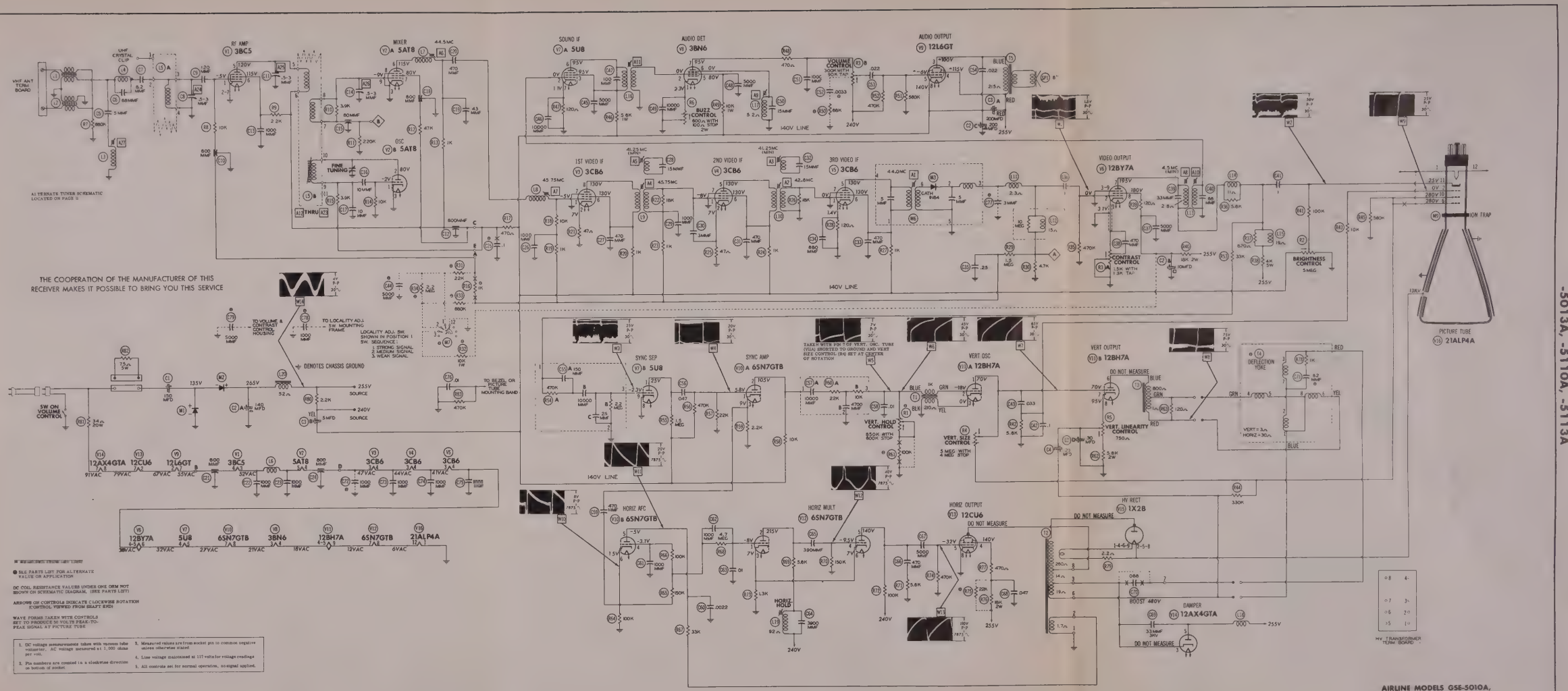
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 5
DENOTES CHASSIS GROUND
140V LINE
SW ON VOLUME CONTROL
RF AMP V1 3BC5
MIXER V2A 5AT8
OSC V2B 5AT8
SOUND IF V7A 5U8
AUDIO DET V8 3BN6
AUDIO OUTPUT V9 12L6GT
1ST VIDEO IF V3 3CB6
2ND VIDEO IF V4 3CB6
3RD VIDEO IF V5 3CB6
VIDEO OUTPUT V6 12BY7A
SYNC SEP V7B 5U8
SYNC AMP V10A 6SN7GTB
VERT OSC V11A 12BH7A
VERT OUTPUT V11B 12BH7A
HORIZ AFC V10B 6SN7GTB
HORIZ MULT V12 6SN7GTB
HORIZ OUTPUT V13 12CU6
HV RECT V15 1X2B
DAMPER V14 12AX4GTA
PICTURE TUBE V16 21ALP4A
ION TRAP
DEFLECTION YOKE
VOLUME CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
VERT. HOLD CONTROL
VERT. SIZE CONTROL
VERT. LINEARITY CONTROL
HORIZ HOLD
BUZZ CONTROL
FINE TUNING
DO NOT MEASURE
BOOST 480V
12KV
255V
240V
TO VOLUME & CONTRAST CONTROL HOUSING
TO LOCALITY ADJ. SW. MOUNTING FRAME
TO BEZEL OR PICTURE TUBE MOUNTING BAND
LOCALITY ADJ. SW. SHOWN IN POSITION 1
SW. SEQUENCE:
1. STRONG SIGNAL
2. MEDIUM SIGNAL
3. WEAK SIGNAL
12AX4GTA 12CU6 12L6GT 3BC5 5AT8 3CB6 3CB6 3CB6
91VAC 79VAC 67VAC 35VAC 32VAC 44VAC 41VAC
12BY7A 5U8 6SN7GTB 3BN6 12BH7A 6SN7GTB 21ALP4A
32VAC 27VAC 21VAC 18VAC 12VAC 6VAC
SEE PARTS LIST FOR ALTERNATE VALUES OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket
3. Measured values are from socket pin to common negative unless otherwise stated
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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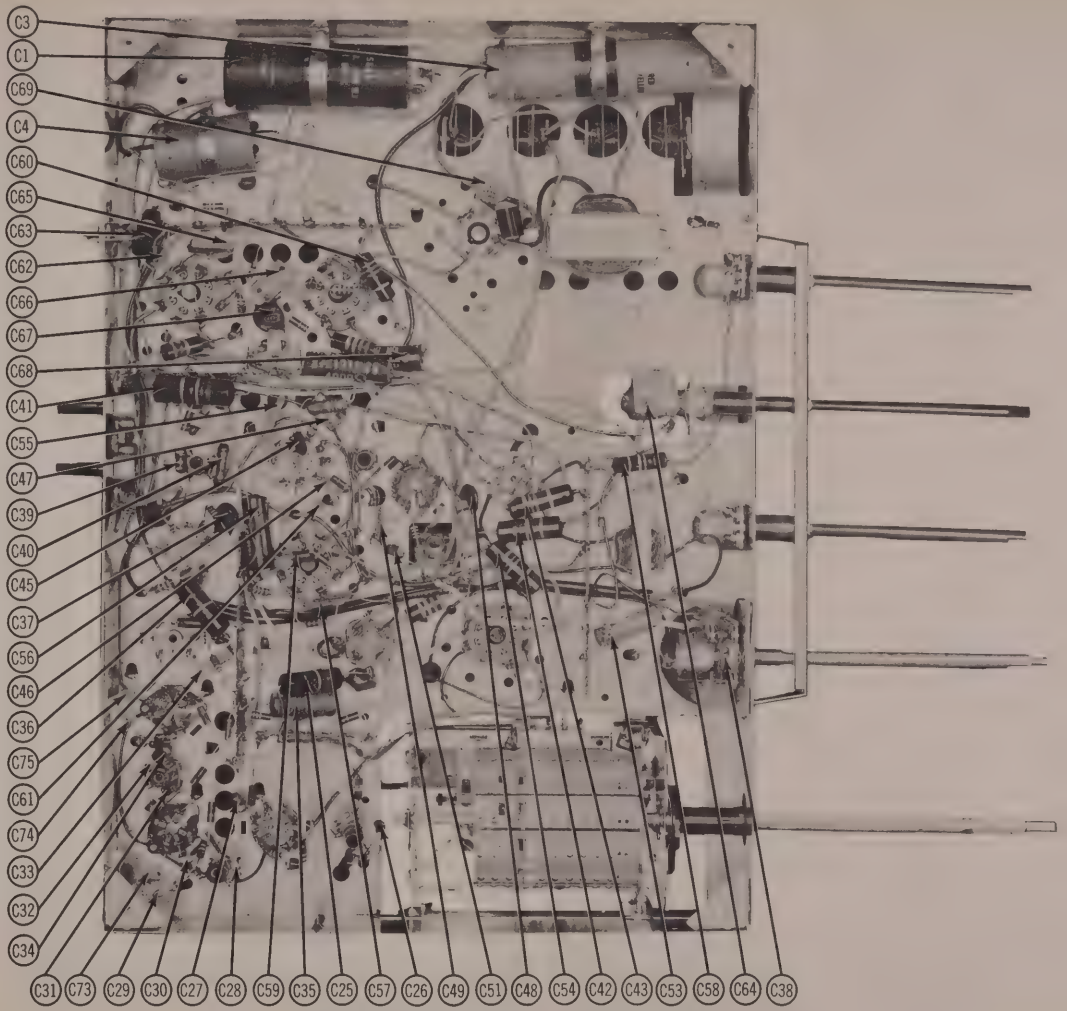
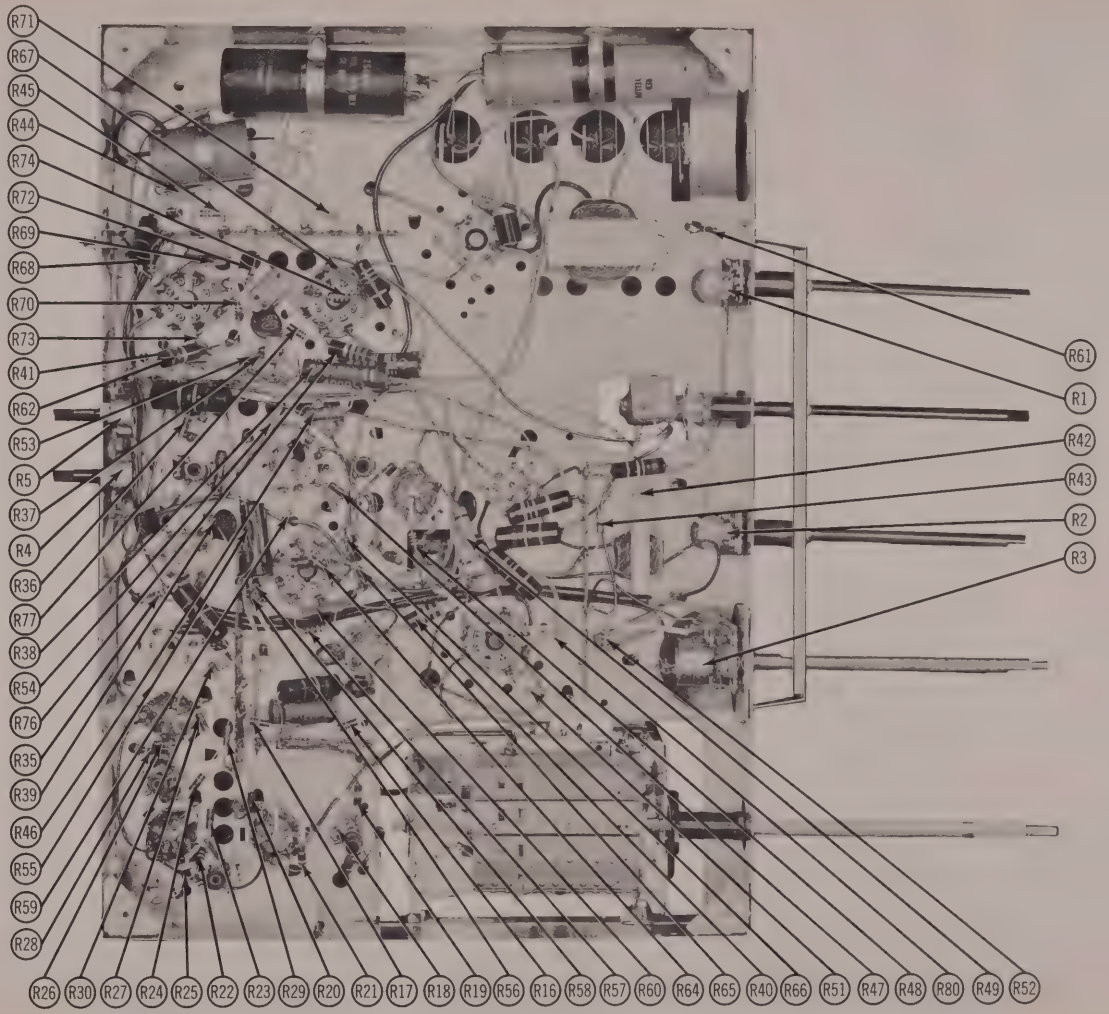
AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A
AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A

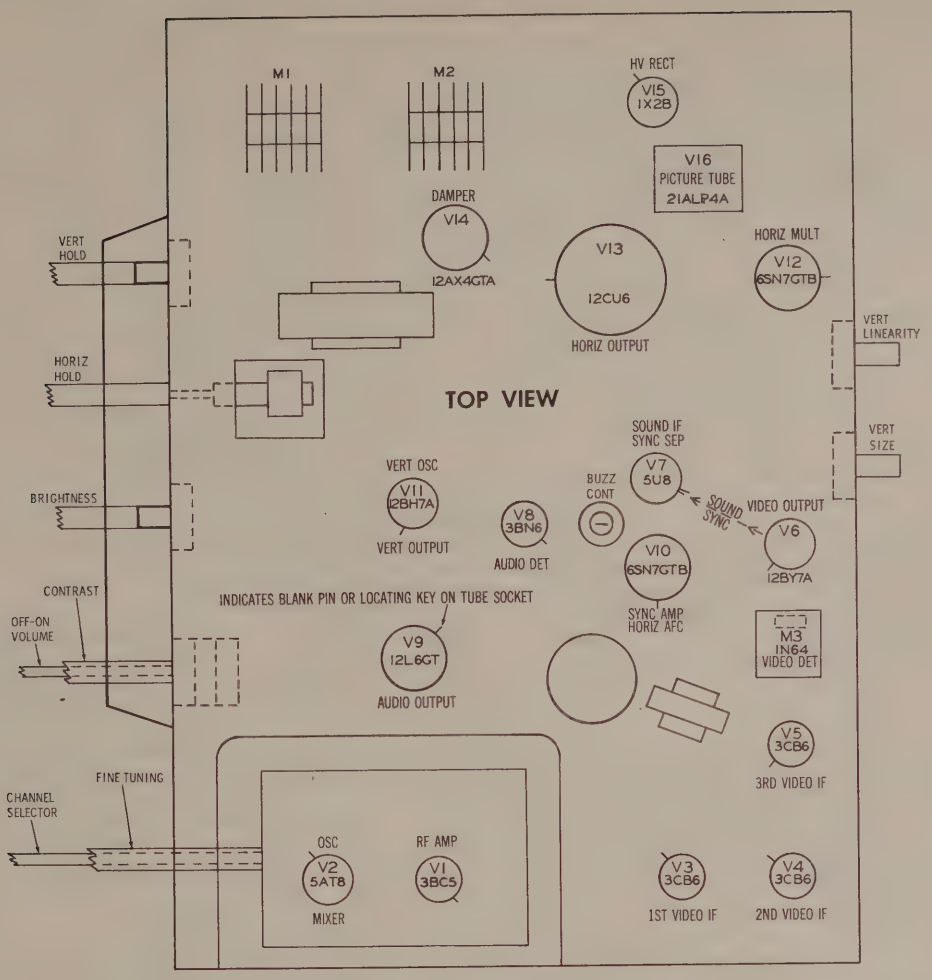


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

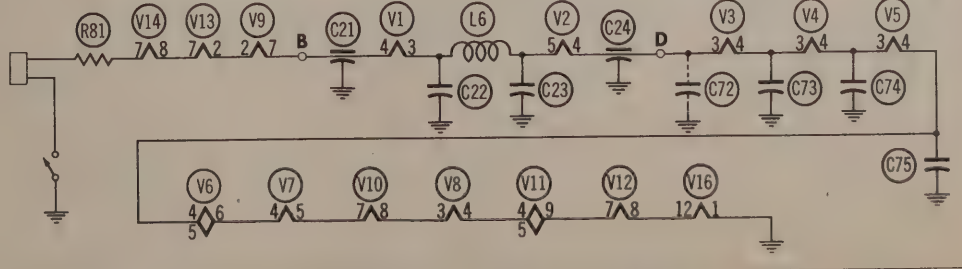
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10, V11**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V11**
Poor vert. linearity or foldover - **V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1, M2**
Vert. off freq. - **V10, V11**
Horiz. off freq. - **V10, V12**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis.
Do not remove the horizontal oscillator tube (V12) to disable the high voltage. Allow a fifteen minute warm-up period for the receiver and test equipment.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias battery to the ungrounded side of C35. Connect the positive lead to chassis.
Use only enough signal generator output to provide usable indication on the VTVM.
Set locality switch (rear panel) to "strong" position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis.	44.0MC	3	DC probe thru 47K to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	42.8MC	"	"	A2	"
3.	"	"	41.25MC	"	"	A3	Adjust for MINIMUM deflection. Repeat steps 1 and 2.
4.	"	"	45.75MC	"	"	A4	Adjust for maximum deflection.
5.	"	"	47.25MC	"	"	A5	Adjust for MINIMUM deflection. Repeat steps 4 and 5.
6.	"	"	44.5MC	"	"	A6	Detune A7 by adjusting fully counter clockwise. Adjust A6 for maximum deflection.
7.	"	"	45.75MC	"	"	A7	Adjust for maximum deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide usable indication on the scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	44MC (10MC Swp.)	41.25MC 42.75MC 45.75MC 47.25MC	3	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 1. If necessary, SLIGHTLY retouch A1, A2, A4, A6, and A7 to obtain desired response. To view 41.25MC and 47.25MC markers, temporarily remove bias battery and increase scope gain and marker generator output. Markers should fall in trap notches as in Fig.1

4.5MC TRAP ALIGNMENT

Set contrast control to maximum.
Connect clip lead from pin 1 of 3CB6 (V5) to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	1KΩ Carbon Resistor	High side thru 1KΩ resistor to pin 2 of 12BY7 (V6). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru crystal diode to pin 11 (cathode) of picture tube. Common to chassis.	A8	Adjust for MINIMUM reading. Remove short from V5.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Turn the set on and tune in a strong TV signal. Turn the buzz control (R6) 90° from maximum clockwise rotation. Adjust A9 for maximum volume. Reduce signal strength. (Remove the antenna from the antenna terminal strip and stray feed the signal by placing the antenna lead near the antenna terminals). Adjust A10 and A11 for maximum volume. Adjust R6 for MINIMUM noise. Reconnect antenna and readjust A9 for maximum volume. If necessary, reduce volume so that this peak can be heard.

ALTERNATE SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set volume control at a low level.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	.01MFD	High side to pin 2 (grid) of 12BY7 (V6). Low side to chassis.	4.5MC (400∿ Mod.) (50KC Swp.)	4.5MC	Any non-interfering channel	Across secondary of audio output trans. (T5).	A9	Set buzz control (R6) 90° from maximum clockwise rotation. Adjust A8 for maximum 400∿ indication on scope.
11.	"	"	"	"	"	"	A11, A10	Attenuate generator output so that signal is below the limiting level of the 3BN6 (V8) as evidenced by background hiss and noise. Adjust A11 and A10 for maximum 400∿ indication on scope.
12.	"	"	"	4.5MC (400∿ AM Mod.)	"	"	R6	Use a high generator output and adjust R6 for MINIMUM 400∿ indication on scope.
13.	"	"	"	4.5MC (Unmod.)	"	"	A8	With volume control at low level, retouch A9 for maximum 400∿ indication on scope.

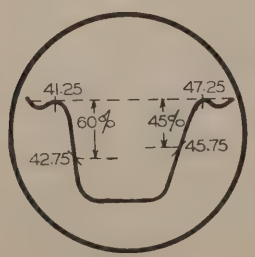


FIG.1

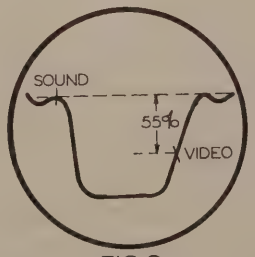


FIG.2

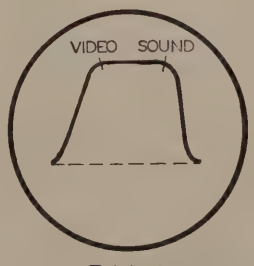


FIG.3

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT FOR ALL TUNERS

Leave bias connected as under "Video IF Alignment".
Restore tube shield on converter tube (V2) to its normal position. The channel oscillator adjustment screws are reached through a hole to the left and just below the channel switch shaft. The correct adjustment screws are accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A12	Adjust to place sound marker in sound trap as in Fig. 2. Video marker should fall at 55%
			207MC (10MC Swp.)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp.)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp.)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp.)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp.)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp.)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp.)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp.)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp.)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp.)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp.)	55.25MC 59.75MC	2		A23	

VHF RF AND MIXER ALIGNMENT FOR ALL TUNERS

Set the locality switch to the "strong" position.
Leave the bias battery connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point Ⓑ. Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 3 with markers above 90%.
16.	"	"	213MC (10MC Swp.)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 3. If markers fall below 70% on any channel, make compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp.)	199.25MC 203.75MC	11			
			195MC (10MC Swp.)	193.25MC 197.75MC	10			
			189MC (10MC Swp.)	187.25MC 191.75MC	9			
			183MC (10MC Swp.)	181.25MC 185.75MC	8			
			177MC (10MC Swp.)	175.25MC 179.75MC	7			
			85MC (10MC Swp.)	83.25MC 87.75MC	6			
			79MC (10MC Swp.)	77.25MC 81.75MC	5			
			69MC (10MC Swp.)	67.25MC 71.75MC	4			
			63MC (10MC Swp.)	61.25MC 65.75MC	3			
			57MC (10MC Swp.)	55.25MC 59.75MC	2			

40MC TRAP ALIGNMENT

The 40MC trap (A27) will require adjustment only where a local interfering signal from 40 to 45MC affects the picture. In such cases, A27 should be adjusted for minimum 40MC beat interference in the picture.

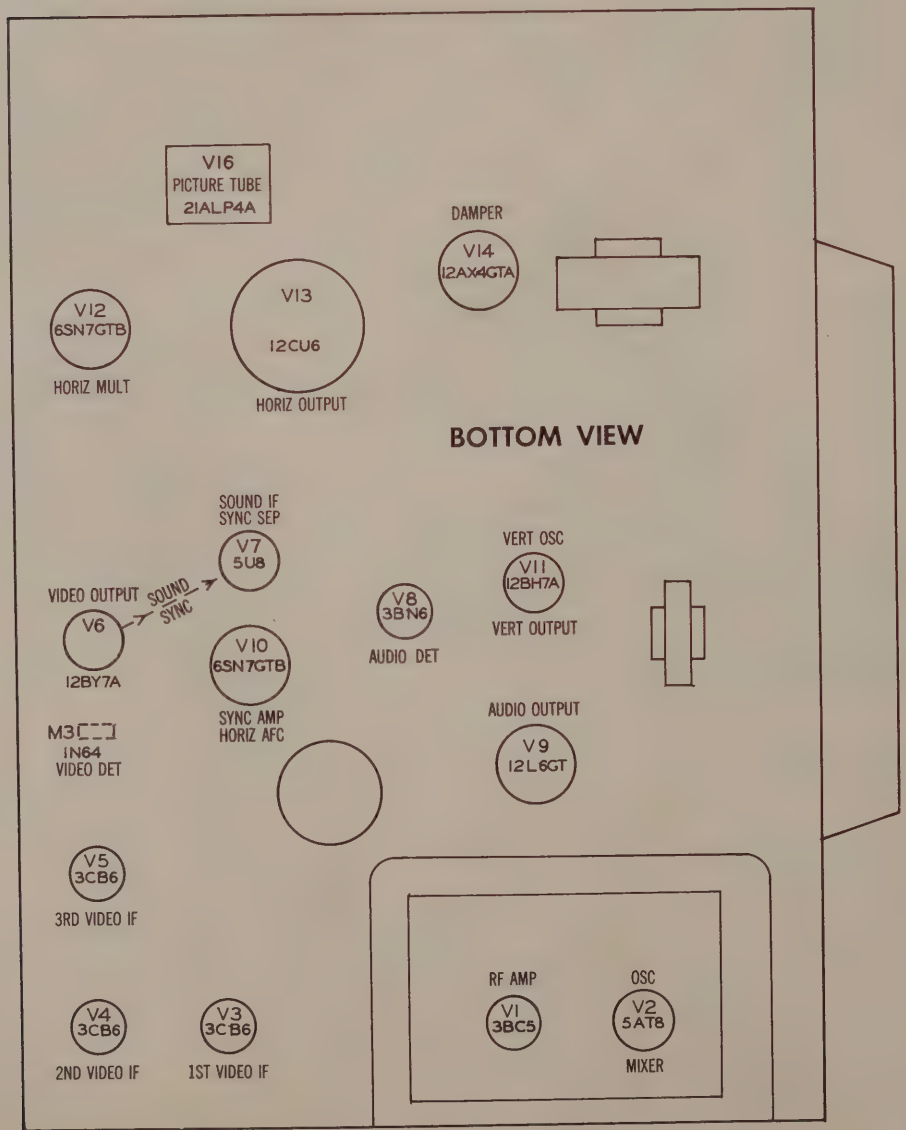
UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.

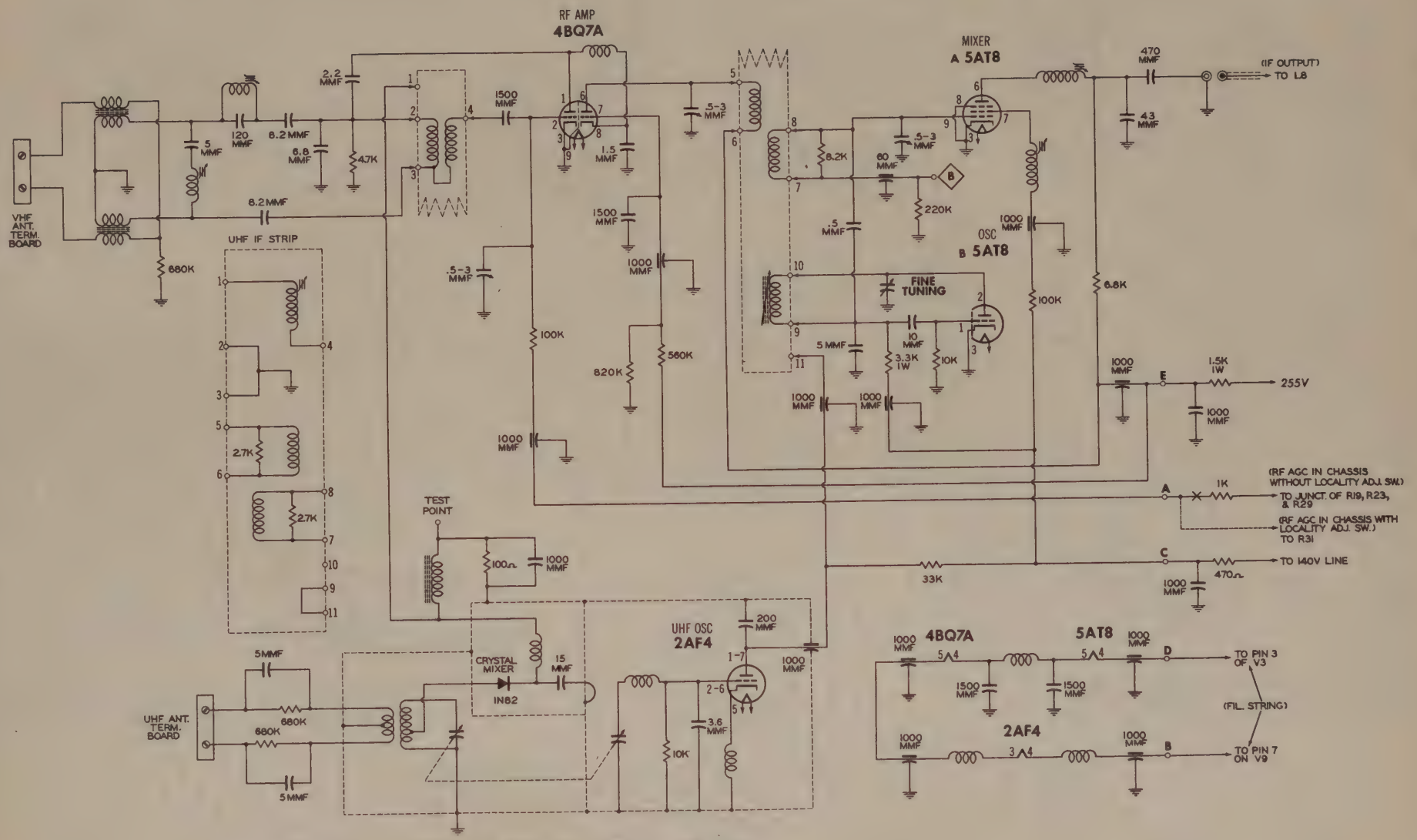
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	3BC5	1.5Meg	0Ω	13Ω	14Ω	■ 470Ω	■ 2.7KΩ	0Ω		
V 2	5AT8	10KΩ	■ 4.4KΩ	0Ω	12Ω	13Ω	■ 1.5KΩ	■ 47KΩ	0Ω	220KΩ
V 3	3CB6	1.5Meg	47Ω	12Ω	11Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 4	3CB6	1.5Meg	47Ω	11Ω	10Ω	■ 1KΩq	■ 1KΩ	0Ω		
V 5	3CB6	.1Ω	120Ω	10Ω	9Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 6	12BY7A	150Ω	470KΩ	0Ω	9Ω	9Ω	8Ω	† 4KΩ	† 18KΩ	0Ω
V 7	5U8	■ 1.5Meg	.9Ω	■ 5.6KΩ	8Ω	7Ω	■ 5.6KΩ	120Ω	0Ω	2.2Meg
V 8	3BN6	300Ω	.6Ω	6Ω	5Ω	■ 10KΩ	5.2Ω	† 300KΩ		
V 9	12L6GT	NC	16Ω	† 265Ω	† 52Ω	250KΩ	NC	14Ω	150KΩ	
V 10	6SN7GTB	22KΩ	■ 10KΩ	2.2KΩ	350KΩ	33KΩ	100KΩ	7Ω	6Ω	
V 11	12BH7A	▲ 2.5Meg	600KΩ	210Ω	5Ω	5Ω	▲ 800Ω	▲ 2.5Meg	6KΩ	3Ω
V 12	6SN7GTB	5Meg	† 7.8KΩ	1.3KΩ	150KΩ	† 100KΩ	1.3KΩ	3Ω	2Ω	
V 13	12CU6	NC	16Ω	TP	† 18KΩ	470KΩ	TP	19Ω	0Ω	TOP CAP ▲ 14Ω
V 14	12AX4GTA	NC	NC	250KΩ	NC	† 52Ω	TP	22Ω	19Ω	
V 15	1X2B		PINS	1 - 9	HAVE	INF	RESISTANCE			TOP CAP ▲ 274Ω
V 16	21ALP4A	0Ω	15KΩ	PIN 6 ▲ 330KΩ	PIN 10 ▲ 330KΩ	PIN 11 ■ 350KΩ	PIN 12 2Ω			

■ MEASURED FROM 140V LINE.
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



UHF-VHF TUNER PART NO. 20E1060 USED WITH MODELS GSE-5110A, GSE-5113A

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE VHF-UHF TUNER SCHEMATIC

AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	3BC5	3BC5	
V2	Osc.-Mixer	5AT8	5AT8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier	3CB6	3CB6	
V6	Video Output	12BY7A	12BY7A	
V7	Sound IF Amplifier-Sync Separator	5U8	5U8	
V8	Audio Detector	3BN6	3BN6	
V9	Audio Output	12L6GT	12L6GT	
V10	Sync Amplifier-Horiz. AFC	6SN7GTB	6SN7GTB	
V11	Vert. Oscillator-Vert. Output	12BH7A	12BH7A	
V12	Horiz. Mult.	6SN7GTB	6SN7GTB	
V13	Horiz. Output	12CU6	12CU6	
V14	Damper	12AX4GTA	12AX4GTA	
V15	HV Rectifier	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: AIRLINE PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No.	NOTES
V16	21ALP4A ①	21ALP4A ①	21ALP4A ①	21ALP4A ① ②	① Aluminized ② Silver screen "SS"
		21ALP4A ②	21ALP4A/B ①	21ALP4A/B ①	
		21ALP4	21ALP4	21ALP4	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No	AEROVOX PART No	CORNELL-DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1	150	150	25E94	AFHS1-70	XA904	FP17	TM-150-150	T-050	TVL-1428
C3A	●40	300	22E57		DJ09	FP419.4	TM-4007	Q-162	TVL-4561
B	●10	300			BR4035	TC78	TD-40-350	MT-454	TVA-1611
C	●200	150							
D	30	150							
C3A	300	150	25E95	AFH82-109	B078	WD345	TDL-305	D-088	TVL-2444
B	5	150							
C4	20	450	25E88	PRS450V20	BR2045	TC75	TD-20-450	FM-4520	TVA-1709

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	5			NPO-D15	TC2-4R7	Z01	NPOA-050	ZT-555	5TCCB-V47	
C7	68			N750-D68	TCH-68	N033	N750L-680		5TCU-Q68	
C8	8.8			NPO-D88.8		E016	NPOA-8R8			
C8	.5-3		31B-902		829-3		31S-01-025	C7565A		
C9	120		151.8V121E	BPD-0001J	DD-121	G044	811-121	UC-5312	5GA-T12	
C10	600		13M-330ZA-1022C							
C11	.5-3		31B-902		829-3		31S-01-025	C7565A		
C12	600		13M-330EA-1032C							
C13	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	.5-3		31B-902		829-3		31S-01-025	C7565A		
C15	60		13M-330Q-600J							
C16	10		151.8G200A							
C17	10		151.8U A100D							
C18	800		13M-330EA-1032C							
C19	43		151.8C430J		TCE-43	Z032	NP0L-430			
C20	470		151.8X471E	BPD-0004T	DD-471	K080	831-471	UC-5347	5GA-T47	
C21	800		13M-330EA-1022C							
C22	1000		151.8X102J	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C24	800		13M-330EA-1032C							
C25	.1	200		P288N-1	DF-104	CUB2P1		P7401	2TM-P1	Note 1
C26	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C27	470		23E4000-26	S1470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C28	15			NPO-S15	TCZ-15	TZ1J	NP0K-150		5TCC-Q15	
C29	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	3			NPO-S3	TCZ-3R3	TZ06	NP0A-030	ZT-553	5TCCB-V33	
C31	470		23E4000-26	S1470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C32	15			NPO-S15	TCZ-15	TZ1J	NP0K-150		5TCC-Q15	
C33	470	500	23E3500-40	S1470	D6-471	TP46	GP2K-471	UC-5347	1FM-347	
C34	680			S1680	D6-681	TP56	GP2K-681	UC-5348	5GA-T68	
C35	.25	100		P288N-25		CUB2P25		P7402S	2TM-P25	
C36	.1	300		P288N-1	DF-104	CUB2P1		P7401	2TM-P1	
C37	5000			BPD-005	DD-502	K080	811-005	UC-525	5HK-D5	
C38	470		23E4000-26	S1470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C39	33		23E4000-30							
C40	68									
C41	.1	400		CUB4P1	DF-104	CUB4P1		P7401	4TM-P1	
C42	.1	300		CUB2P1	DF-104	CUB2P1		P7401	2TM-P1	
C43	.033	400	23E3413	BPD-03	DF-303	CUB6S33		P7S33	6TM-S33	
C44	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	Note 2
C45	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C46	10000		23E4004-27	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C47	100	500		1681-0001	D6-101	RR6T1	801-101	MC5S35	M5-J1	
C48	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C49	10000		23E4004-17	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C50	15									
C51	1000			S1000	D6-102	TP52	GP2L-102	DC-521	5HK-D1	
C52	.0033	400		S3300	D6-332	CUB6D33	GP2-333-332	P7S33	6TM-D33	Note 3
C53	.022	200		BPD-02	DF-203	CUB4S22	817-02	PT422	4TM-S22	
C54	.022	400		BPD-02	DF-203	CUB4S22	817-02	PT422	4TM-S22	
C55A	150			BPD-0001S	D6-151	TP36	GP2K-151	UC-5315	5GA-Q15	
B	10000		723E2023-8	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C	25			S25	D6-250	TP26	GP1K-250	UC-5425	5GA-Q25	
C56	.047	400		BPD-05	DF-503	CUB4S47		PT447	4TM-S47	
C57A	10000		433E2023-8	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
B	4700			BPD-0047	DD-473	K079	811-0047	DC-526	5HK-D47	
C58	.01	400	23E2424							
C59	470		23E4000-26	S1470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C60	.0022	400		SI2200	D6-222	CUB6D22	GP3-333-222	PT8222	6TM-D22	
C61	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C62	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C63	.01	400		BPD-01	DD-103	K083	811-01	DC-511	4TM-S1	
C64	3900	500	23E4005-31	1464-0099			1R5D39	MCE463	M5-J39	
C65	390	500	23E3500-39	1469-00039	D6-391		5R5T39	5U-391	MC5243	M5-J39
C66	470	500	23E3500-40	1469-00047	D6-471		5R5T47	5U-471	MC5245	M5-J47
C67	5000			BPD-005	DD-502	K080		811-005	DC-525	5HK-D5
C68	.047	400		BPD-05	DF-503	CUB4S47			PT447	4TM-S47
C69	33	3000	23E4003-8	RVD-30-33	DD30-330	CUB4S33	33KV-330		DC90433	60GA-S33
C70	.068	400	23E2315	P468N-068		CUB4S68				4TM-S68
C71	82									
C72	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C73	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C74	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C75	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C76	.01	600		BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C77	5			NP0-S13.3	TCZ-3R3	TZ06	NP0A-030	ZT-553	5TCCB-V33	
C78	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C79	5000			BPD-005	DD-502	K080	811-005	DC-526	5HK-D5	

Note 1. Not used in UHF versions.
Note 2. Used only in versions with locality adjuster switch.
Note 3. Not used in some versions
Note 4. Some versions use 68MMF in this application.
Note 5. Used only in UHF versions.
† Items C55A, C55B, C55C, R54A and R54B are combined in one unit.
● Items C57A, C57B, R60A and R60B are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	250KΩ	½	26E124	AB-56 *	A47-750K-8*	QU-134 *	TA55L *	Vertical Hold-Stop at 800KΩ
B	Shaft		Not Req.	AK-4	B28-3	Not Req.	Not Req.	Attach to R1A-Note 1
R2	5Meg	½	26E127			QU-141	TA56R	Brightness
R3A	1500Ω	½	26E125				UE16938	Contrast (Panel) Tapped at 1300Ω
B	300KΩ	½						Volume & Switch (Rear) Tapped at 90KΩ
R4A	5Meg	½	26E126	AB-56 *	A47-4Meg-2*	QU-141 *	TAP56L *	Vertical Size-Stop at 4Meg
B	Shaft		Not Req.	AK-19	BN-3	TQ	Not Req.	Attach to R4A.
R5A	750Ω	½	26E125	AB-5	A47-750-8	QU-105	TAP75L	Vertical Linearity
B	Shaft		Not Req.	AK-18	BN-3	TQ	Not Req.	Attach to R5A.
R6	600Ω	2	26E122		39-500-100			Buzz (Wire Wound) Stop at 100Ω

Note 1. Part No. 26E126 used in some versions.
* Connect a 270KΩ resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
* Connect a 1Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control(control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	NOTES
R7	680Ω	½		BTS-680K	
R8	10KΩ	½		BTS-10K	
R9	2200Ω	½		BTS-2200	
R10	3900Ω	½		BTS-3900	
R11	220KΩ	½		BTS-220K	
R12	47KΩ	½		BTS-47K	
R13	1000Ω	½		BTS-1000	
R14	10KΩ	½		BTS-10K	
R15	3900Ω	½		BTS-3900	
R16	1000Ω	½		BTS-1000	Note 1
R17	470Ω	½		BTS-470	
R18	10KΩ	½		BTS-10K	
R19	1000Ω	½		BTS-1000	
R20	1000Ω	½		BTS-1000	
R21	470	½		BTS-1000	
R22	18KΩ	½		BTS-47	
R23	1000Ω	½		BTS-1000	
R24	1000Ω	½		BTS-1000	
R25	47Ω	½		BTS-47	
R26	18KΩ	½			
R27	1000Ω	½		BTS-1000	
R28	120Ω	½		BTS-120	
R29	1.5Meg	½		BTS-1.5Meg	
R30	4700Ω 5%	½		BTS-4700 5%	
R31	2.5KΩ	½		BTS-2.5K	Note 2
R32	10KΩ	1		BTA-10K	Note 2
R33	680KΩ	½		BTS-680K	Note 2
R34	2.1Meg	½		BTS-2.2Meg	Note 2
R35	470KΩ	½		BTS-470K	
R36	56000 5%	½		BTS-5600 5%	
R37	820Ω	½		BTS-820	
R38	4000Ω	9	27E1018-38	PW7-4000	
R39	120Ω	½		BTS-120	
R40	18KΩ	2		BTB-18K	
R41	100KΩ	½		BTS-100K	
R42	5600Ω	½		BTS-5600	
R43	10KΩ	½		BTS-10K	
R44	330KΩ	½		BTS-330K	
R45	560KΩ	½		BTS-560K	
R46	56000	1		BTA-5600	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	NOTES
R47	120Ω	½		BTS-120	
R48	470Ω	½		BTS-470	
R49	10KΩ	1		BTA-10K	
R50	68KΩ	½		BTS-68K	Note 3
R51	560KΩ	½		BTS-560K	
R52	470KΩ	½		BTS-470K	
R53	33KΩ	½		BTS-33K	
R54A	470K		†23E2023-8	BTS-470K	
B	2.2Meg			BTS-2.2Meg	
R55	1.5Meg	½		BTS-1.5Meg	
R56	470KΩ	½		BTS-470K	
R57	22KΩ	½		BTS-33K	
R58	10KΩ	½		BTS-10K	
R59	2200Ω	½		BTS-2200	
R60A	22K		●33E2023-8	BTS-33K	
B	10K			BTS-10K	
R61	100KΩ	½		BTS-100K	
R62	5600Ω	½		BTS-5600	
R63	120Ω	½		BTS-120	
R64	100KΩ	½			
R65	150KΩ	½			
R66	100KΩ	½		BTS-100K	
R67	33KΩ	½		BTS-33K	
R68	4.7Meg	½			
R69	5600Ω	½		BTS-5600	
R70	150KΩ	½			
R71	5600Ω	½		BTS-5600	
R72	100KΩ	½		BTS-100K	
R73	1300Ω 5%	½	27E1523-½	BTS-1300 5%	
R74	470KΩ	½			
R75	22KΩ	½			Note 3
R76	18KΩ	2			
R77	470Ω	½			
R78	1000Ω	½			
R79	2.2Ω	½		SW½-2.2	
R80	2200Ω	½		BTS-2200	
R81	34Ω	30	27E1016-37		
R82	7.5Ω	5	20E1042		
R83	470KΩ	½		BTS-470K	

Note 1. Not used in models with locality adjuster switch.
Note 2. Used in models with locality adjuster switch.
Note 3. Not used in some versions.
† Items R54A, R54B, C55A, C55B, C55C are combined in one unit.
● Items R60A, R60B, C57A, C57B are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: AIRLINE PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	Vert. Osc. Trans.	22E89-2	B6702	A-3003	20VT1 ①	V405	A-8125	26A03	A-97X
T2	Horiz. Output Trans.	20E1029							
T3	Vert. Output Trans.	22E101	Z1805 ① ②	A-2825		V306 ① ②	A-8140 ① ②	26S87 ① ②	A-110X ①
T4A	Yoke(90°) Horiz. (20-5M H)	20E1159-2 ②							
B	Vert. (3.3M H)								

① Drill new mounting hole(s).
② Connect as auto transformer.
③ Airlines Part No. 20E1159 listed as an alternate part.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: AIRLINE PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T5	2.4KΩ	3-4Ω	22E90	Z1005	A3025	A3332	26S69	S-12X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: AIRLINE PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	8"	PM	3-4Ω	1E54-3	BA2H	20B62	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L2	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L3	IF Trap	0Ω						
L4	FM Trap	0Ω						
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-302B				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-303B				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-304B				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-305B				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-306B				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-307B				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-308B				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-309B				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-310B				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-311B				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-312B				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-313B				Channel 13
L6	FIL Choke	0Ω		31M-300				
L7	Conv. Plate	.1Ω		31UA-506				
L8	1st Video IF	.1Ω		20E1032				
L9	2nd Video IF	.1Ω	.1Ω	20E1033				Includes 47.25MC Trap
L10	3rd Video IF	.1Ω	.1Ω	20E1034				Includes 41.25MC Trap
L11	Series Peaking Coil	2.3Ω		20E1039	19-1065		4612	12 Microhenries
L12	Shunt Peaking Coil	15Ω		20E363-19	19-4400 ■		4648 ■	190 Microhenries, Wound on 1MEG resistor
L13A	4.5MC Trap	2.8Ω		20E1035				
B	1st Sound IF	.9Ω					4649	
L14	Series Peaking Coil	12Ω		20E363-25	19-3250	TV-125	6130	270 Microhenries
L15	Shunt Peaking Coil	19Ω	.6Ω	20E363-26 20E1036			6156	800 Microhenries
L16	2nd Sound IF	.6Ω						
L17	Quadrature Coil	5.3Ω		20E1037	20-1005	TV-151	1460	
L18	RF Choke	.2Ω		20E1194	19-1001		4804	L-7 Microhenries

* Use one winding only
■ Parallel with 10Meg resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No	Ram PART No	Thordarson PART No	NOTES
L19	0Ω		20E1038							

FILTER CHOKE

ITEM No	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (I) CURRENT 1000 (A)	REPLACEMENT DATA: AIRLINE PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
L20	.200ADC	52Ω	1H†	22E100	C2040	C2004	C2257	28C41	C-31X

AIRLINE MODELS GSE-5010A, -5013A, -5110A, -5113A

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

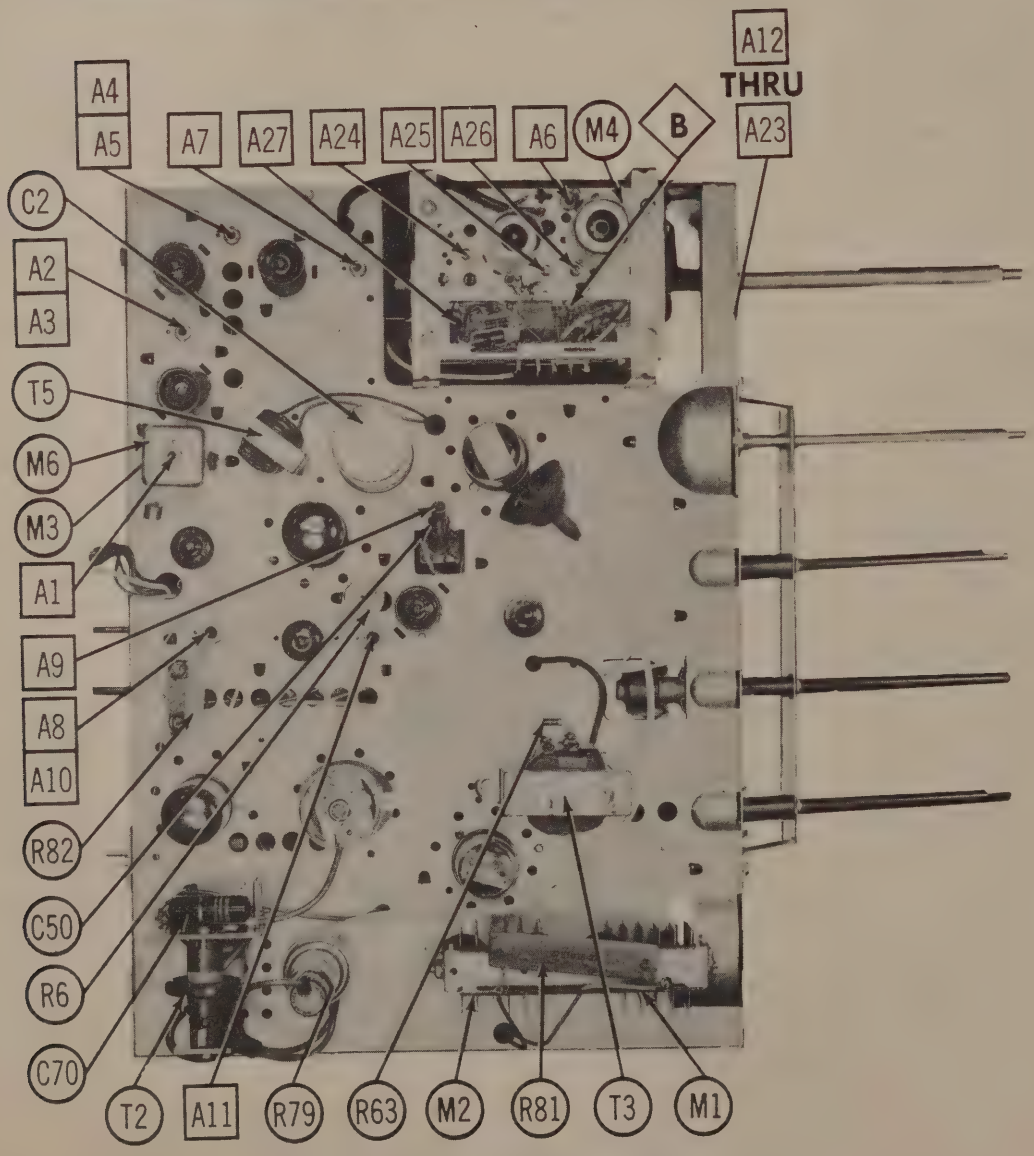
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	AIRLINE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.200A	57E16	1236A	MR300	6S300	6Q4	300	
M2	.200A	57E16	1236A	MR300	6S300	6Q4	300	

CRYSTAL DIODES

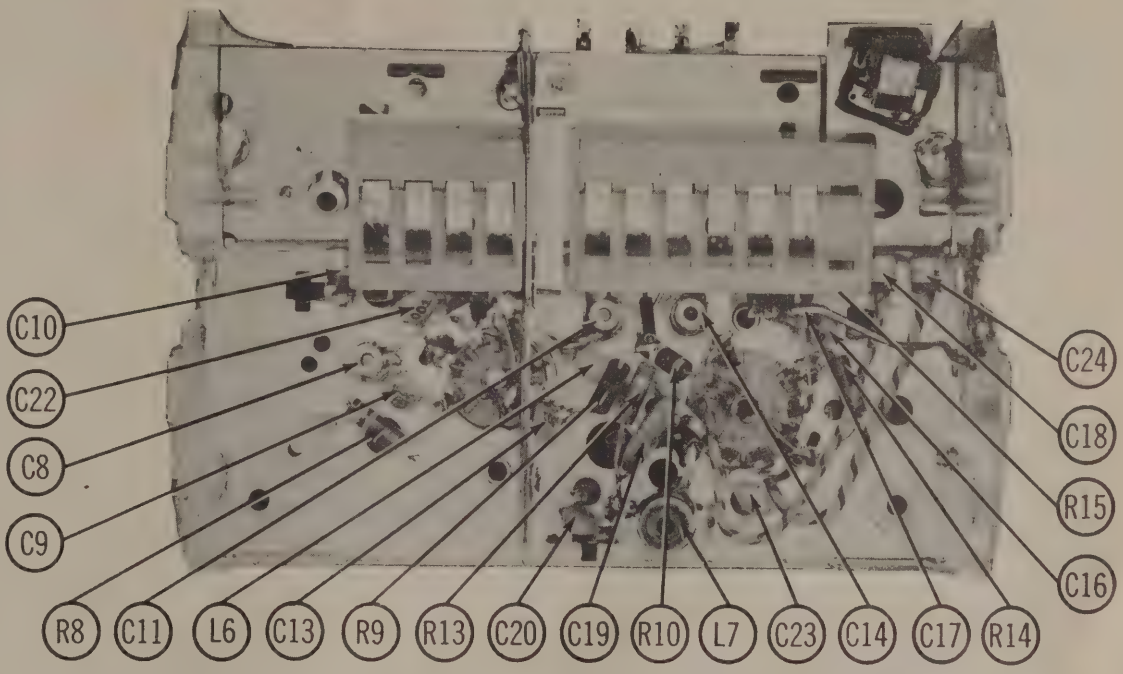
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		AIRLINE PART No.	SYLVANIA PART No.	
M3	1N64	95E1	1N60	Video Det. (Pigtail)

MISCELLANEOUS

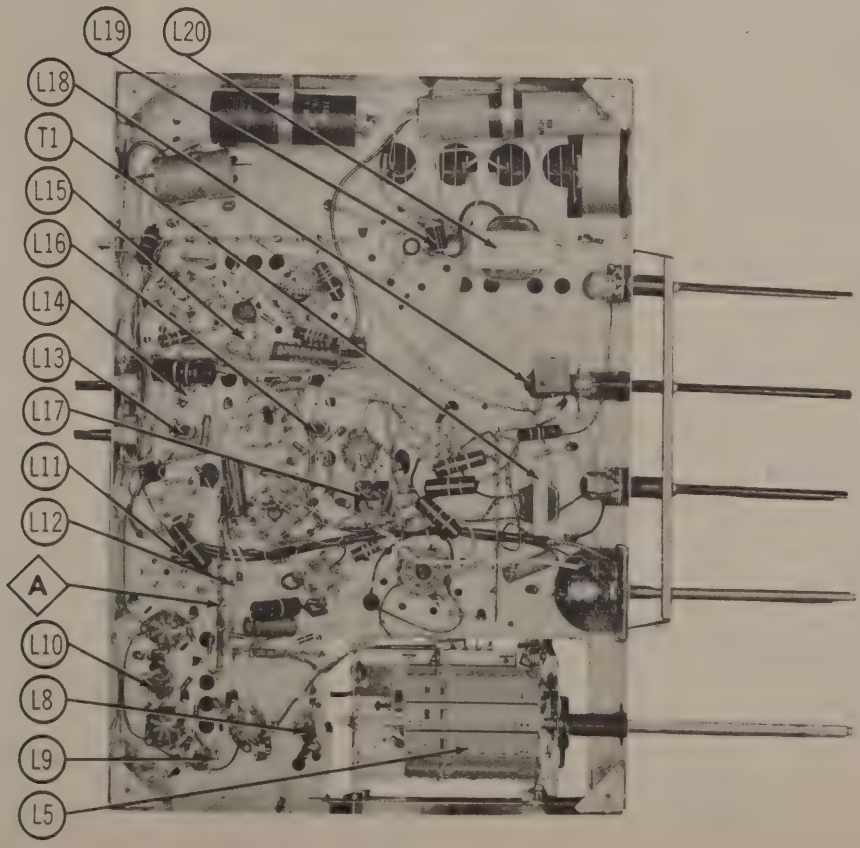
ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Tuner	20E1040	VHF (Pentode)-Models GSE-5010A, GSE-5013A
M5	Tuner	20E1060	VHF-UHF Combination-Models GSE-5110A, GSE-5113A
M6	Video Det. Assy.	20E1167	Includes M3, Coils & Capacitors
M7	Switch	29E30-3	Locality (Rotary-Wafer Type) Not used in some versions
M8	Centering Device		Part Of Deflection Yoke (T4) Rear Cover
M9	Ion Trap	15E174-4	
	Knob	37E102-2	VHF Channel Selector-Models GSE-5010A, GSE-5013A
	Knob	37E109	VHF Channel Selector-Models GSE-5110A, GSE-5113A
	Knob	37E103-2	Fine Tuning-Models GSE-5010A, GSE-5013A
	Knob	37E110-2	Fine Tuning-Models GSE-5110A, GSE-5113A
	Knob	37E104-2	Contrast
	Knob	37E91-4	Vert. Hold, Horiz. Hold, Brightness
	Knob	37E91-5	On-Off-Volume
	Knob	37E108-3	UHF Channel Selector
	Mask	36E105-2	
	Safety Glass	9E50-9	



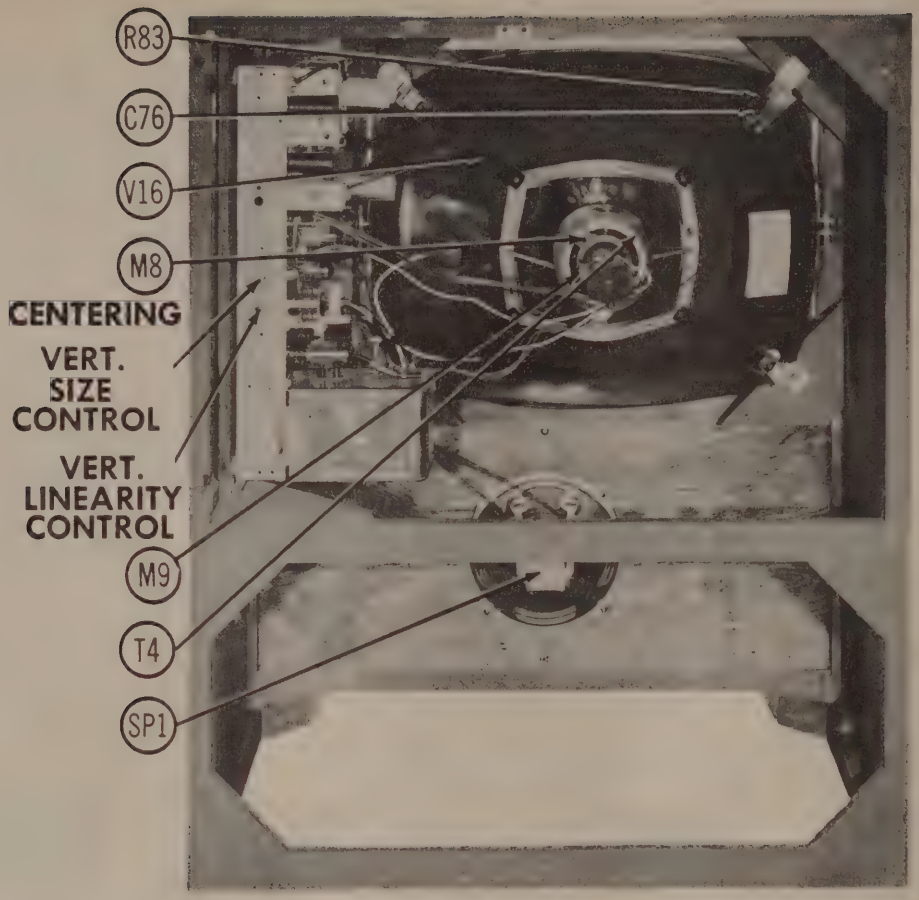
CHASSIS TOP VIEW



RF TUNER-BOTTOM VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.

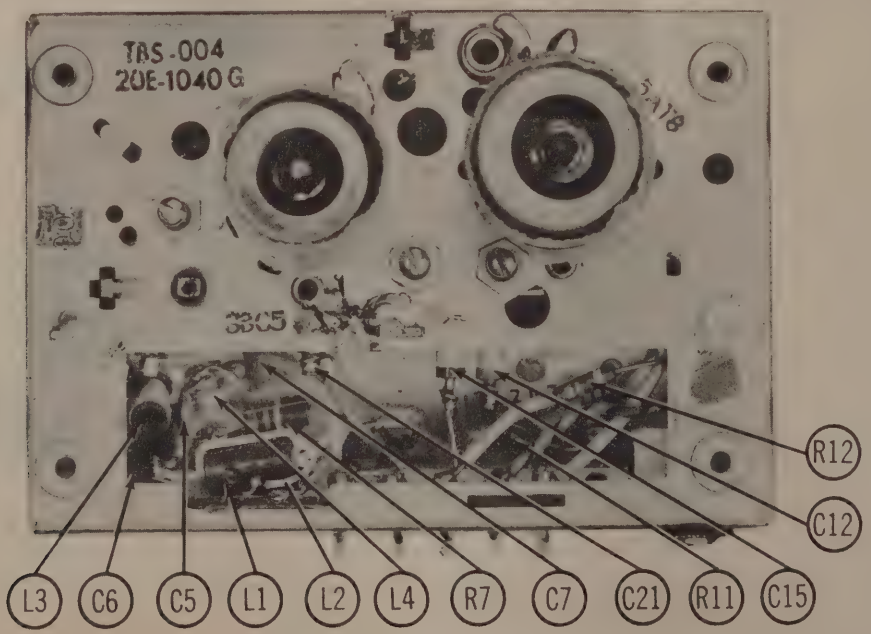


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Turn the horizontal hold control (L18) until the picture synchronizes horizontally.



RF TUNER TOP VIEW

BROCINER
MODEL Mark 10

BROCINER
MODEL Mark 10

TRADE NAME	Brociner Model Mark 10
MANUFACTURER	Brociner Elect. Lab., 344 E. 32nd St., New York 16, New York
TYPE SET	AC Operated 5 Channel Audio Amplifier With Preamplifier And Equalizer
TUBES (Six)	Types 12AX7 Preamplifier, 12AX7 AF Amplifier, 12AX7 AF Amplifier - Phase Inverter, (2) 6AQ5 Output, 6X4 Rectifier.
POWER SUPPLY	110 - 120 Volts AC 50/60 Cycles RATING .56 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

BROCINER
MODEL MARK 10

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		BROCINER PART No.	STANDARD REPLACEMENT	
V1	Preamplifier	12AX7	12AX7	
V2	AF Amplifier	12AX7	12AX7	
V3	AF Amplifier - Phase Inverter	12AX7	12AX7	
V4	Output	6AQ5	6AQ5	
V5	Output	6AQ5	6AQ5	
V6	Rectifier	6X4	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	BROCINER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	10	450		AFH4-13	BBRD2245	WQ775	CDB-D20-450CN	MTD-4520	TVA-2730
B	20	450			BR1045		TD-10-450	MT-4510	TVA-1705
C	20	450							
C2A	20	450			BBRD2245	WQ775	CDB-D20-450CN	CST-537	TVA-2730
B	20	450			BR505		TD-50-50	MT-0550	TVA-1308
C	50	50							

FIXED CAPACITORS

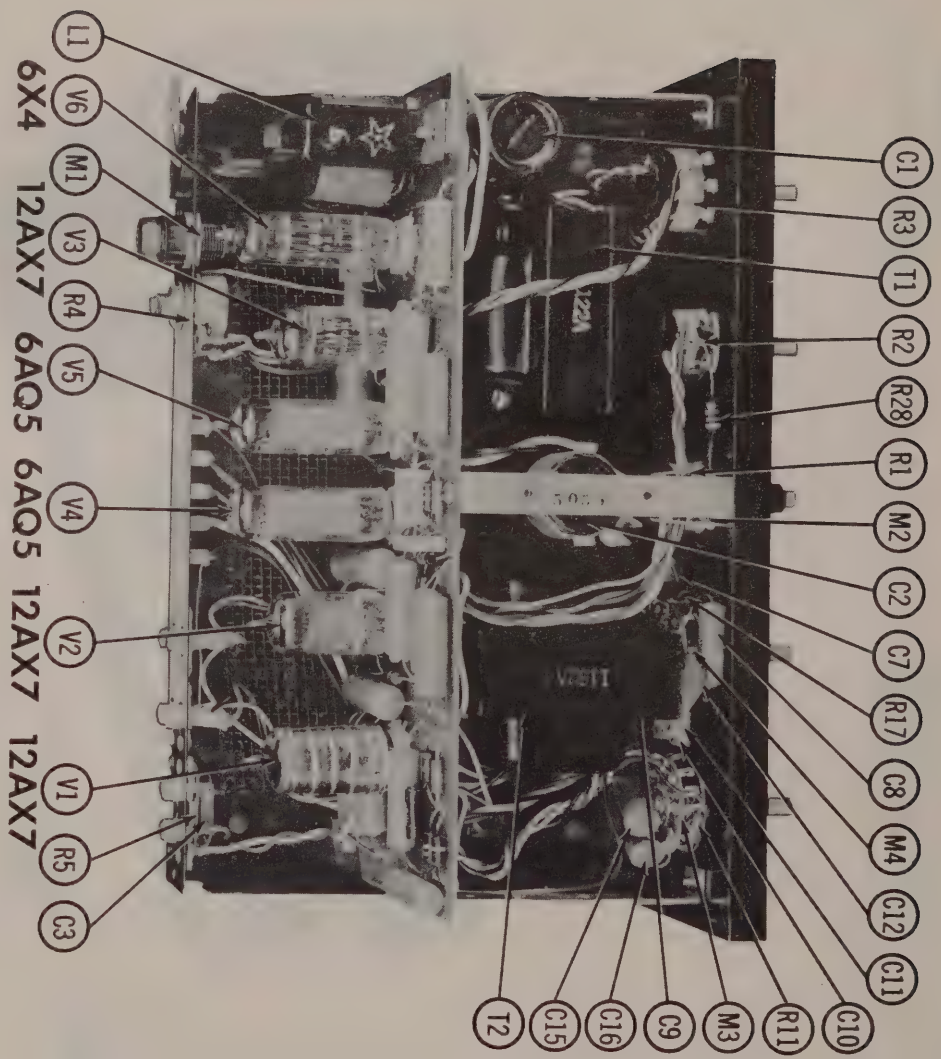
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	BROCINER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	220	500		NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C4	.02	400								
C5	.05	400								
C6	.03	200								
C7	.03	200								
C8	.01	200								
C9	.0039	200		1464-0039		1R5D39		MCB463	MS-239	
C10	330	500		1469-00033	D6-331	5R5T33	811-331		MS-333	
C11	330	500		1469-00033	D6-331	5R5T33	811-331		MS-333	
C12	1000	500		1464-001		1R5D1	811-102	MCB255	MS-21	
C13	.02	400								
C14	.05	400								
C15	.05	400								
C16	.05	400								
C17	220	500		NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C18	.0025	200		1464-0025		1R5D25		MCB460	MS-225	
C19	.02	400								
C20	.05	400								
C21	220	500		NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C22	.0025	200		1464-0025		1R5D25		MCB460	MS-225	
C23	.1	400								
C24	.01	200								
C25	.1	400								
C26	.1	400								
C27	390	500		1469-00039	D6-391	5R5T39	811-391	MCB243	MS-339	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	BROCINER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	1118A	B-744	A47-1Meg-S	Q11-137	U-54	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	1Meg	½	1118A	B-744	A47-1Meg-S	Q11-137	U-54	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	1117A	ABT-62	A47F1-500K	Q18-133X	UT-429	Loudness Tap at 40KΩ
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R3A
R4A	500Ω	½		AB-4	A47-500-S	Q11-103	U-2	Signal to Noise Ratio
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	Attach to R4A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROCINER PART No.	IRC PART No.	
R5	27KΩ	½		BTS-27K	
R6	4.7Meg	½		BTS-4.7Meg	
R7	62KΩ	½		BTS-62K 5%	
R8	4.7Meg	½		BTS-4.7Meg	
R9	62KΩ	½		BTS-62K 5%	
R10	4.7Meg	½		BTS-4.7Meg	
R11	470KΩ	½		BTS-470K	
R12	100KΩ	½		BTS-100K	
R13	62KΩ	½		BTS-62K 5%	
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½		BTS-10K	
R16	1Meg	½		BTS-1Meg	
R17	100KΩ	½		BTS-100K	
R18	100KΩ	½		BTS-100K	
R19	1Meg	½		BTS-1Meg	
R20	100KΩ	½		BTS-100K	
R21	1600Ω	½		BTS-1600 5%	
R22	1Meg	½		BTS-1Meg	
R23	100KΩ	½		BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROCINER PART No.	IRC PART No.	
R24	1600Ω	½		BTS-1600 5%	
R25	6800Ω	½		BTS-6800	
R26	47KΩ	½		BTS-47K	
R27	100KΩ	½		BTS-100K	
R28	47KΩ	½		BTS-47K	
R29	22KΩ	½		BTS-22K	
R30	100KΩ	½		BTS-100K	
R31	270KΩ	½		BTS-270K	
R32	820Ω	½		BTS-820	
R33	220KΩ	½		BTS-220K	
R34	220KΩ	½		BTS-220K	
R35	1000Ω	1		BTS-1000	
R36	270KΩ	½		BTS-270K	
R37	270KΩ	½		BTS-270K	
R38	1000Ω	½		BTS-1000	
R39	300Ω	5		PW7-300	
R40	22KΩ	½		BTS-22K	
R41	560Ω	½		BTS-560	
R42	3300Ω	½		BTS-3300	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	BROCINER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .56A	640VCT @ .078A	6.3V @ 2.55A		1122A					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BROCINER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	10KΩ		1132A				22893		

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	BROCINER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.078A	168Ω	3.37HY.	1123A	C5040	C-2994	C-2327	26C82	

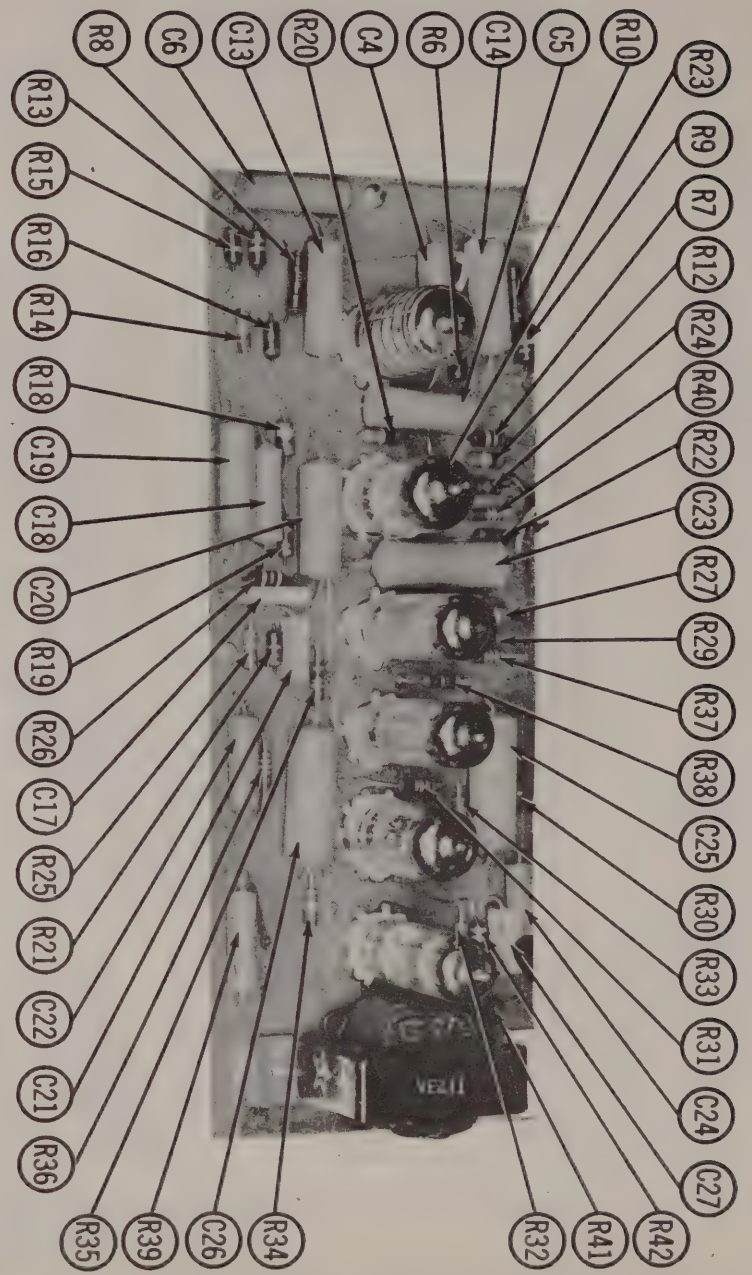
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BROCINER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312002. (3AG2A)	342001	AGC2	HKP

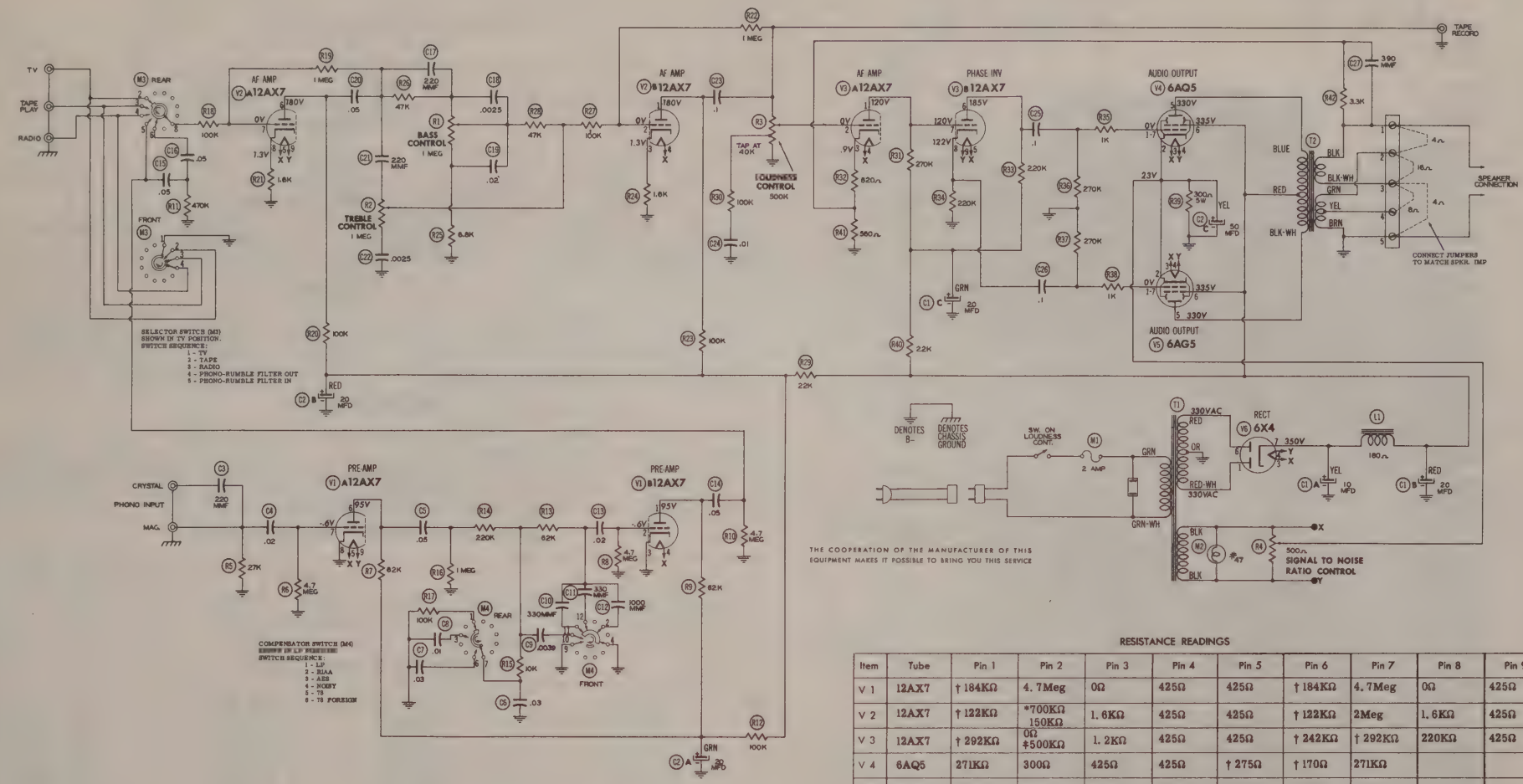
MISCELLANEOUS

ITEM No.	PART NAME	BROCINER PART No.	NOTES
M2	Pilot Light	8-47	#47
M3	Switch	1163A	Selector (rotary - wafer type)
M4	Switch	1164A	Record Compensator (rotary - wafer type)

CHASSIS—BOTTOM VIEW



BROCINER MODEL MARK 10



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	† 184KΩ	4. 7Meg	0Ω	425Ω	425Ω	† 184KΩ	4. 7Meg	0Ω	425Ω
V 2	12AX7	† 122KΩ	*700KΩ 150KΩ	1. 6KΩ	425Ω	425Ω	† 122KΩ	2Meg	1. 6KΩ	425Ω
V 3	12AX7	† 292KΩ	0Ω ‡500KΩ	1. 2KΩ	425Ω	425Ω	† 242KΩ	† 292KΩ	220KΩ	425Ω
V 4	6AQ5	271KΩ	300Ω	425Ω	425Ω	† 275Ω	† 170Ω	271KΩ		
V 5	6AQ5	271KΩ	300Ω	425Ω	425Ω	† 275Ω	† 170Ω	271KΩ		
V 6	6X4	280Ω	NC	425Ω	425Ω	NC	280Ω	50KΩ		

ALL MEASUREMENTS TAKEN IN PHONO POSITION.
† MEASURED FROM PIN 7 OF V6
*BASS CONTROL FULLY CLOCKWISE
‡ LOUDNESS CONTROL FULLY CLOCKWISE
NC - NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CAPEHART
MODEL 2C56 (Ch. CR202)

CAPEHART
MODEL 2C56 (Ch. CR202)

TRADE NAME	Capehart Model 2C56 (Ch. CR202)
MANUFACTURER	Capehart-Farnsworth Corp., Fort Wayne 1, Ind.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock.
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540 KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	Loop	455KC (400~ mod.)	Tuning gang fully open. (Short out osc. section of tuning gang).	Across voice coil	A1, A2, A3, A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	"	1620KC	1620KC (Remove short).	"	A5	"
3.	"	"	1500KC	1500KC	"	A6	"
4.	"	"	537KC	537KC	"	A7	Adjust for maximum output while rocking tuning gang.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		CAPEHART PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det-AVC-AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CAPEHART PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	650326A-1	PRS150V5050	BBRD5515	TCD49	TDL-D50-150	MTD-1550	TVA-2453
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	470		2239-013	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C3	56		2241-554							
C4	.047	200	2246-4730	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C5A	220		♦452244A-1	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
B	2000									
C	5000									
D	250									
E										
C6	.01	600	2248-1030	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C7	.022	600	2248-2230	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C8	.047	600	2248-4730	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	

♦Items C5A, C5B, C5C, C5D, C5E, R8A, R8B and R8C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CAPEHART PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	452241A-1	B-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

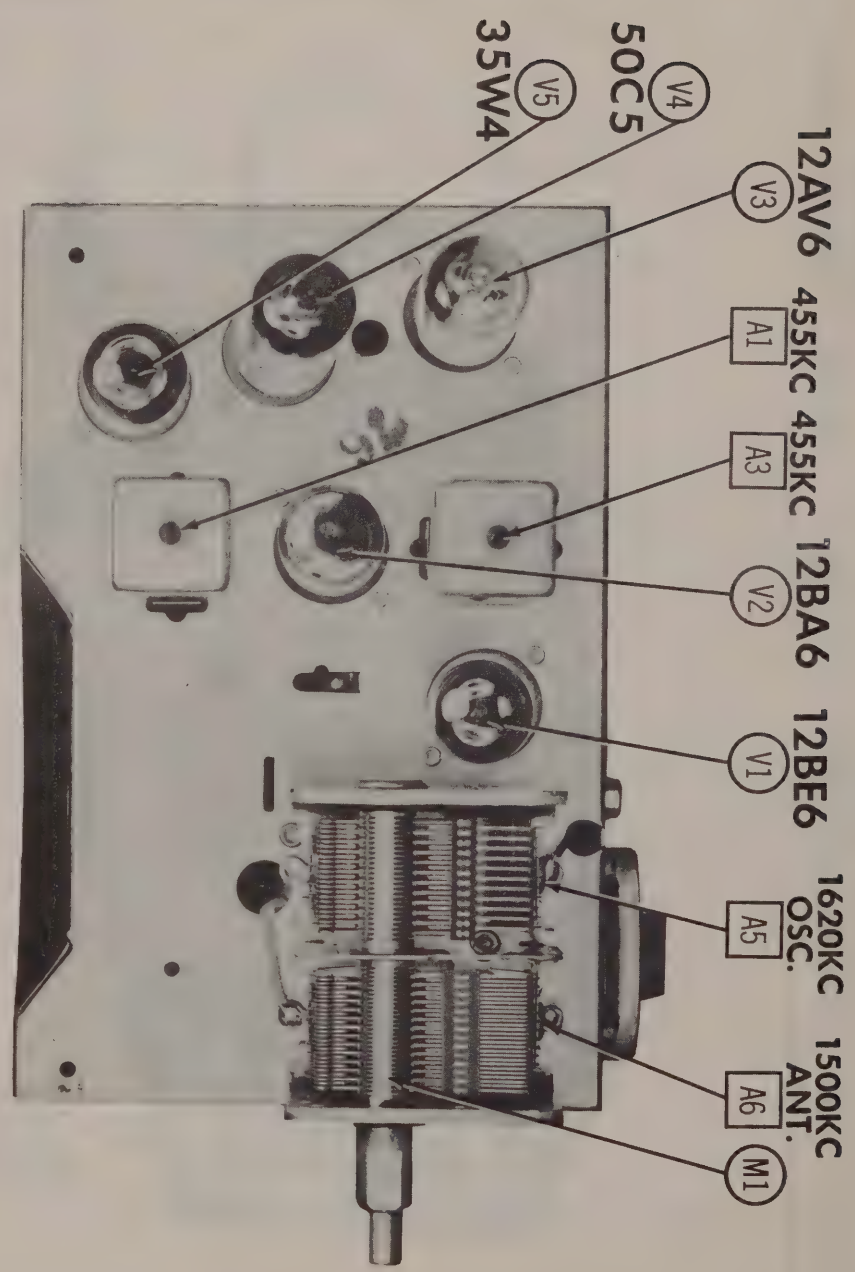
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CAPEHART PART No.	IRC PART No.	
R2	47Ω	½	3229-470	BTS-47	
R3	22KΩ	½	3229-223	BTS-22K	
R4	1Meg	½	3229-105	BTS-1Meg	
R5	82Ω	½	3229-820	BTS-82	
R6	3.3Meg	½	3229-335	BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CAPEHART PART No.	IRC PART No.	
R7	220KΩ	½	3229-224	BTS-220K	
R8A	6.8Meg		♦452244A-1	BTS-6.8Meg	
B	470KΩ			BTS-470K	
C	470KΩ			BTS-470K	
R9	150Ω	½	3229-151	BTS-150	
R10	1500Ω	1	3232-152	BTA-1500	

♦Items R8A, R8B, R8C, C5A, C5C, C5E, are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CAPEHART PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.6KΩ	3-4Ω	Part of 750204B-2	Z1102 ①	A3031 ①	A3336 ①	24S50A ①	S-16X ①	①Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CAPEHART PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	750204B-2	4A07	223S1	

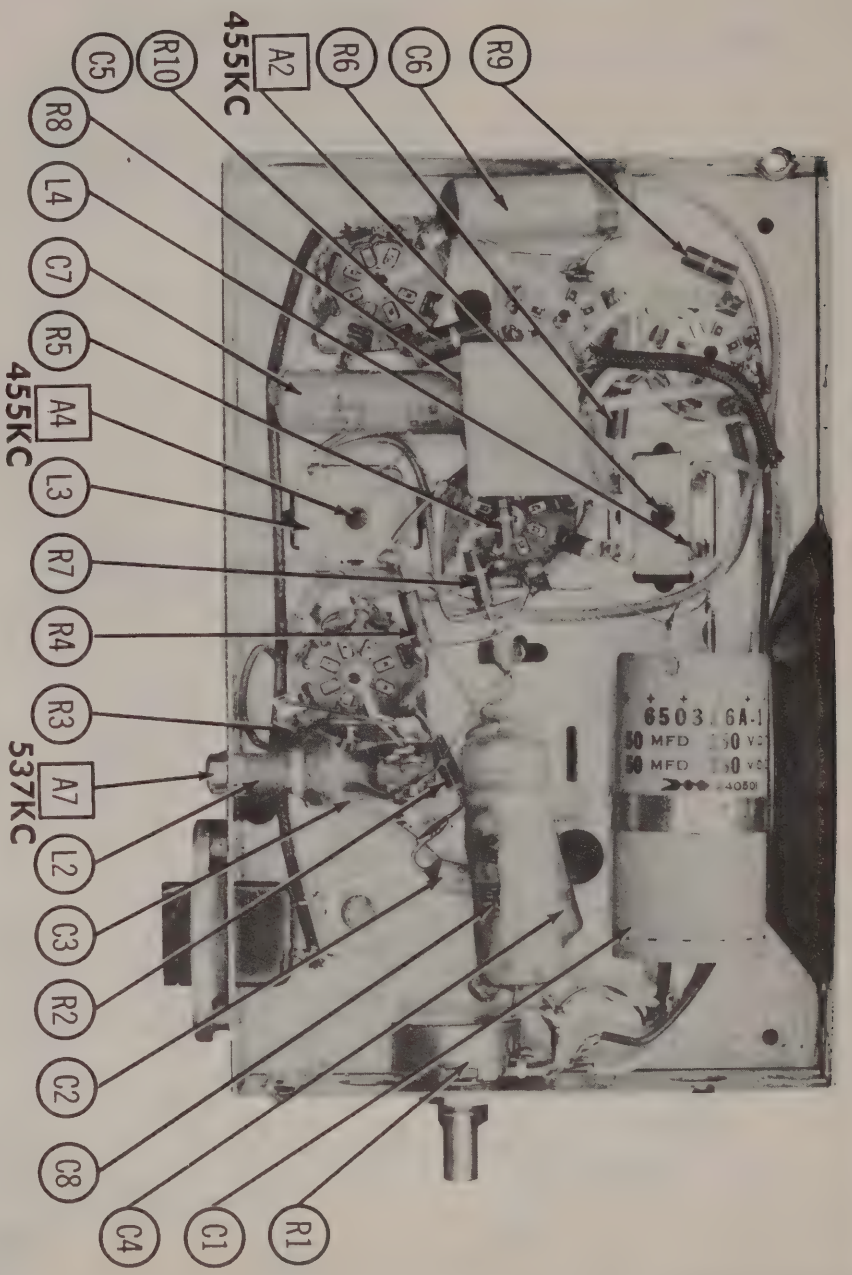
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CAPEHART PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.8Ω		750491B-1				Includes cabinet back
L2	Osc. Coil	.4Ω	4.8Ω	452242C-1	14-1060	BC-387	70-OSC	
L3	Input IF	13Ω	13Ω	452243A-1	16-6758	BC-352	12-C1	
L4	Output IF	13Ω	13Ω	452243A-1	16-6758	BC-353	12-C2	

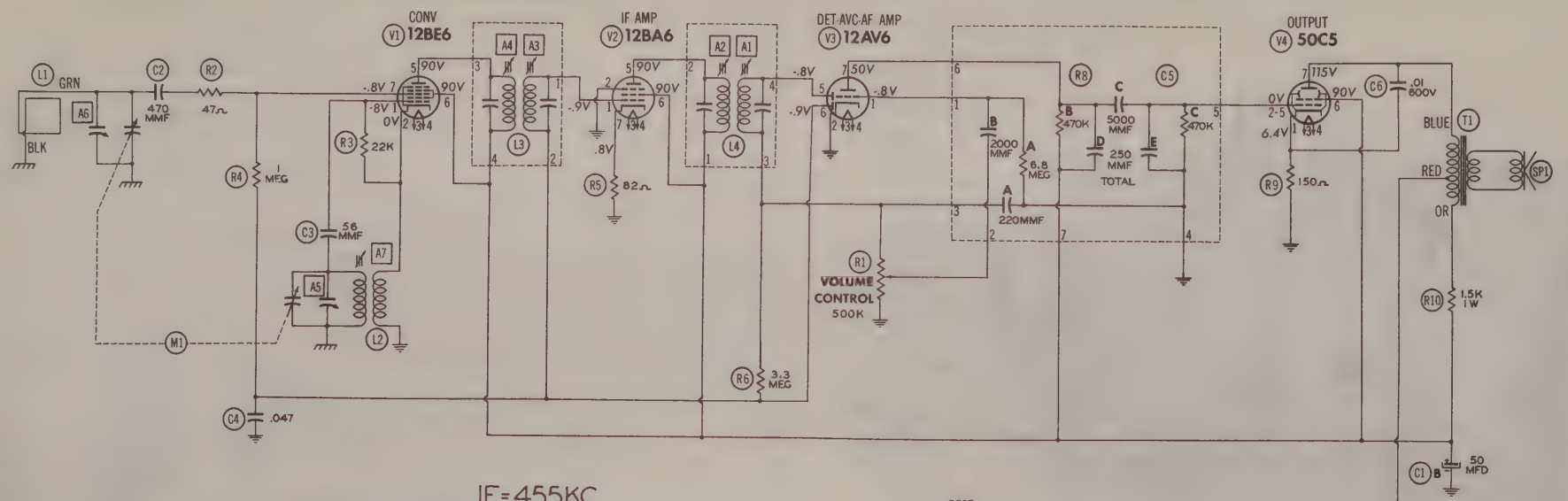
MISCELLANEOUS

ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M1	Tuning Cap.	650327A-1	2 gang (29 - 470MMF; 23 - 170MMF)
M2	Clock	750509D-4	
	Cabinet	950303A-1	Ivory
	Cabinet	950303A-3	Brown
	Knob	452240A-10	Volume & tuning - ivory
	Knob	650325A-15	Dial - ivory
	Knob	452240A-13	Volume & tuning - brown
	Knob	650325A-14	Dial - brown
	Knob	451655A-1	Clock - clear
	Crystal	451656A-1	Clock face

CHASSIS—BOTTOM VIEW



CAPEHART MODEL 2C56 (Ch. CR202)



IF=455KC

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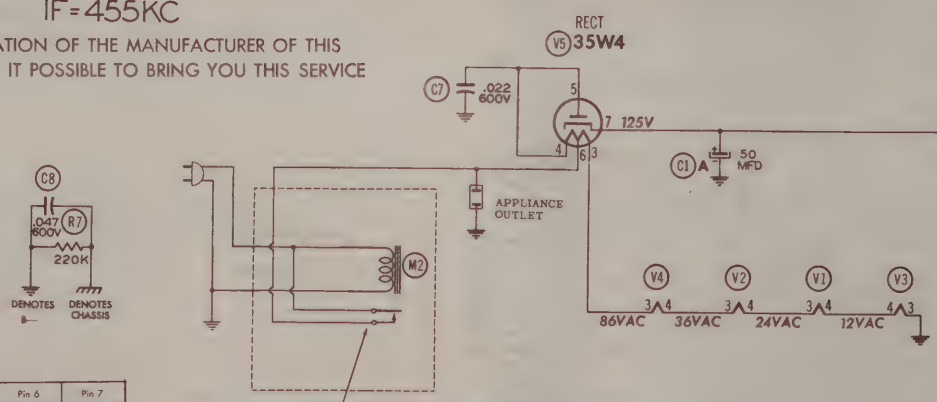

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	24Ω	12Ω	*1.5KΩ	*1.5KΩ	4.8Meg
V 2	12BA6	3.8Meg	0Ω	36Ω	24Ω	*1.5KΩ	*1.5KΩ	82Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	3.8Meg	*470KΩ
V 4	50C5	150Ω	470KΩ	86Ω	36Ω	470KΩ	*1.5KΩ	*200Ω
V 5	35W4	NC	TP	86Ω	121Ω	121Ω	115Ω	100KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
* MEASURED FROM PIN 7 OF V5.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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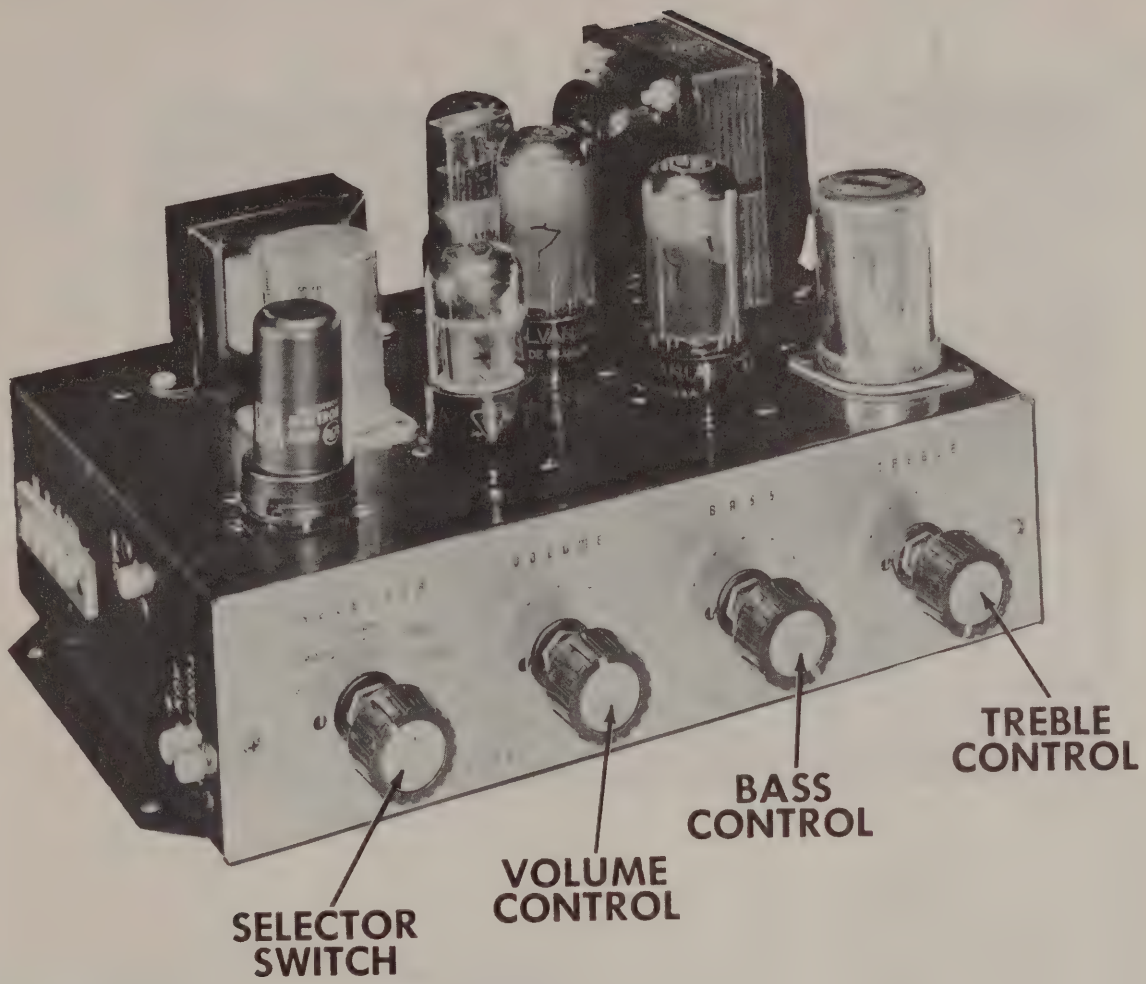
CHALLENGER MODEL HF8A

CHALLENGER MODEL HF8A



CHALLENGER MODEL HF8A

TRADE NAME	Challenger Model HF8A
MANUFACTURER	Challenger Amplifier Co., 29 Ninth Ave., New York 14, N. Y.
TYPE SET	AC Operated 3 Channel 10 Watt Audio Amplifier
TUBES (Five)	Types 6SC7 Preamplifier, 6SL7GT AF Amplifier-Phase Inverter, (2) 6V6GT Output, 6X5GT Rectifier.
POWER SUPPLY	110 - 120 Volts AC - 60 Cycles RATING .40 Amp. @ 117 Volts AC

PROPERTY OF
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DENVER, COLORADO

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		CHALLENGER PART No.	STANDARD REPLACEMENT	
V1	Preamplifier	6SC7	6SC7	
V2	AF Amplifier - Phase Inverter	6SL7GT	6SL7GT	
V3	Output	6V6GT	6V6GT	
V4	Output	6V6GT	6V6GT	
V5	Rectifier	6X5GT	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CHALLENGER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲10	450		AFH4-09	D008	WP433.6	TDL-D10-450	MTD-4510	R1508*
B	▲10	450		AFH4-09	D008	WP433.6	TM-Q5-450	Q-070	R1424*
C2A	▲5	450							
B	5	450							
C	■5	450							
D	▲5	450							
C3	10	25		PRS25V10	BR102	TC22	TD-10-25	FM-0210	TVA-1204

*Units must be ordered from mfgr.

FIXED CAPACITORS

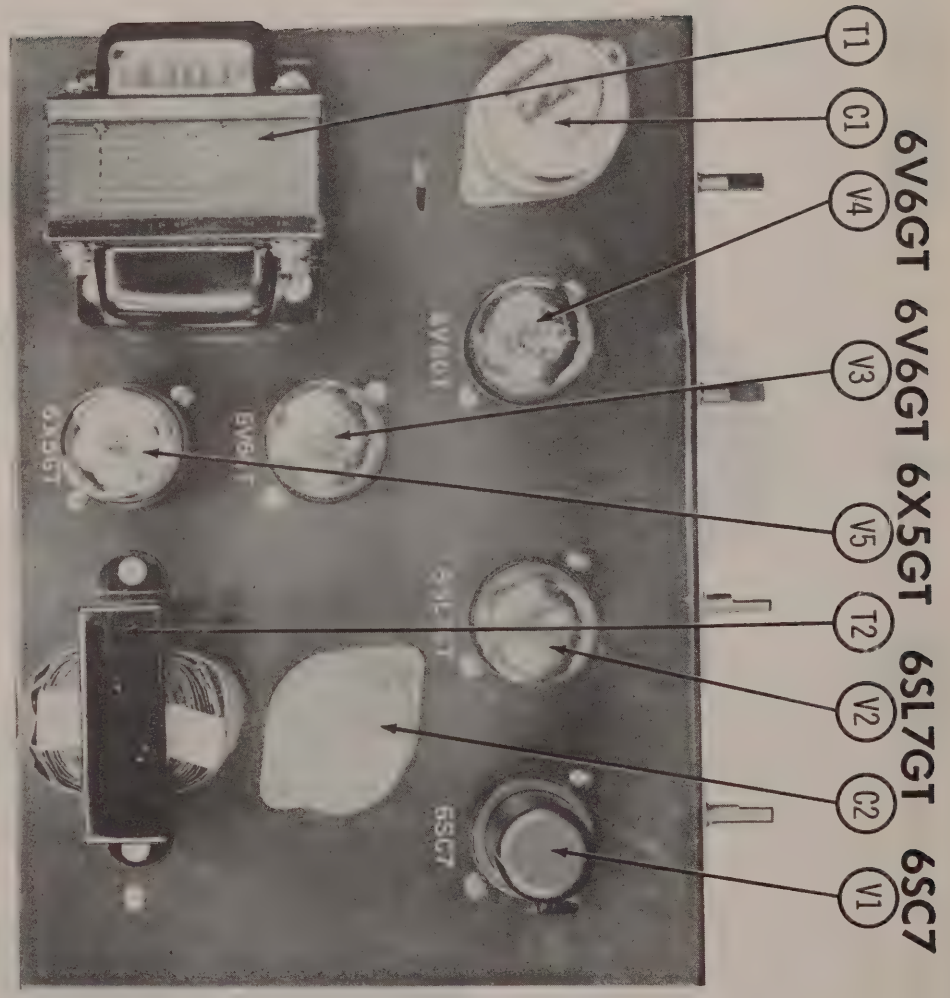
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CHALLENGER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C5	750			1464-00075		1R5T75	811-751		MS-375	
C6	2200			1464-0022		1R5D22			MS-222	
C7	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C8	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	1000			1464-001		1R5D1	811-102	MCB255	MS-21	
C10	2200			1464-0022		1R5D22			MS-222	
C11	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C12	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C13	100			NPO-SI100	TCZ-100	TZ30	801-101	MCB235	5TCC-T1	
C14	100			NPO-SI100	TCZ-100	TZ30	801-101	MCB235	5TCC-T1	
C15	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CHALLENGER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	V340B	B-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	25KΩ	½	V368	B-26	A47-25K-S	Q11-130	U-29	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	V323A	AB-60	A47-500K-Z	Q13-133	U-48	Treble
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R3A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Challenger PART No.	IRC PART No.	
R4	100KΩ	½		BTS-100K	
R5	3.3Meg	½		BTS-3.3Meg	
R6	68KΩ	½		BTS-68K	
R7	3.3Meg	½		BTS-3.3Meg	
R8	100KΩ	½		BTS-100K	
R9	150KΩ	½		BTS-150K	
R10	100KΩ	½		BTS-100K	
R11	47KΩ	½		BTS-47K	
R12	47KΩ	½		BTS-47K	
R13	100Ω	½		BTS-100	
R14	47KΩ	½		BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Challenger PART No.	IRC PART No.	
R15	220KΩ	½		BTS-220K	
R16	2200Ω	½		BTS-2200	
R17	220KΩ	½		BTS-220K	
R18	2200Ω	½		BTS-2200	
R19	470KΩ	½		BTS-470K	
R20	18KΩ	½		BTS-18K	
R21	470KΩ	½		BTS-470K	
R22	2200Ω	2		BTB-2200	
R23	47KΩ	2		BTB-47K	
R24	270Ω	2		BTB-270	
R25	2200Ω	½		BTS-2200	
R26	22KΩ	½		BTS-22K	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CHALLENGER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .40A	510VCT @ .066A	6.3VAC @ 2.1A			P9205 ①	P3148	PC8403	26R31U	

① Tape 5V winding

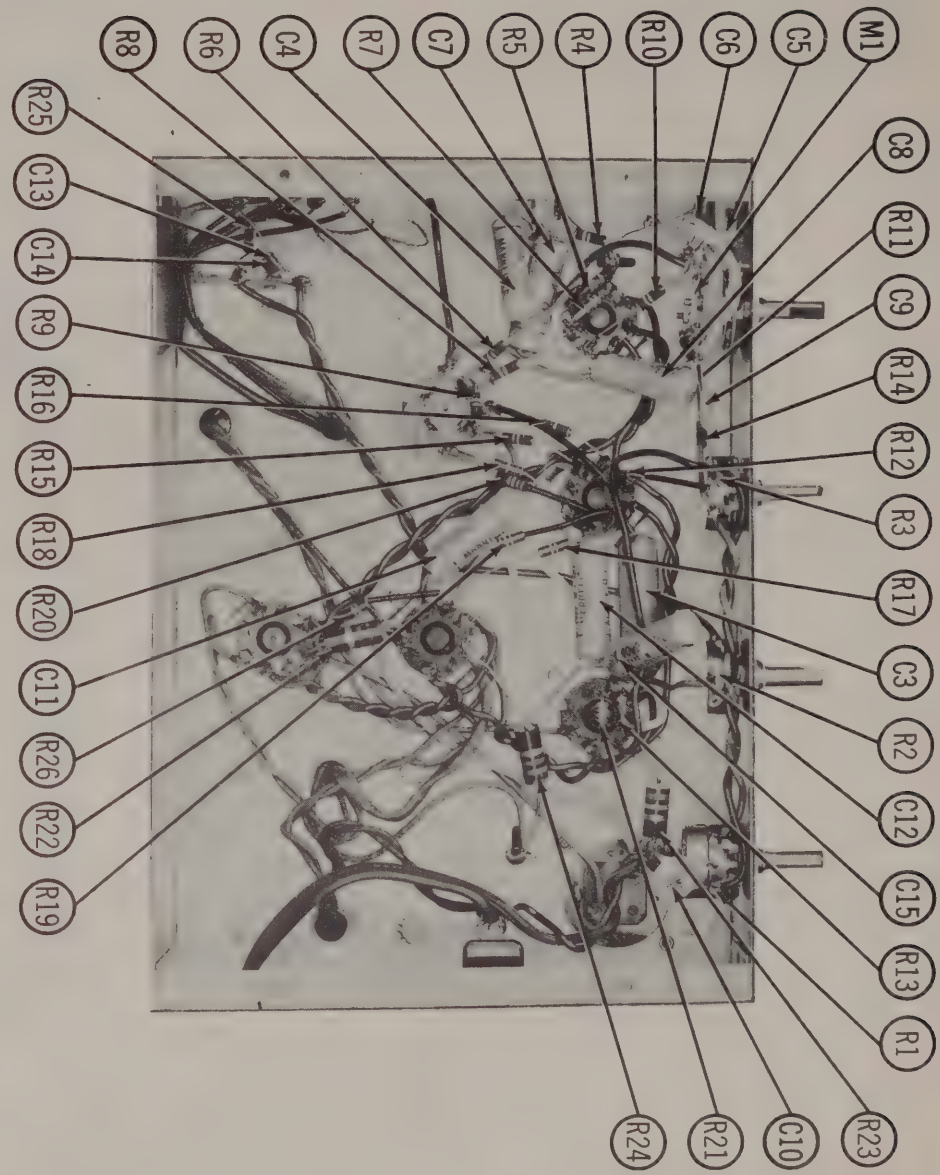
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Challenger PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	3.65KΩ	16Ω Taps @ 8Ω, 4Ω		Z1404 ①		A-3870	26S59		① Drill one new mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	CHALLENGER PART No.	NOTES
M1	Switch	S435A	Selector (2 pole - 5 position; rotary - wafer type)

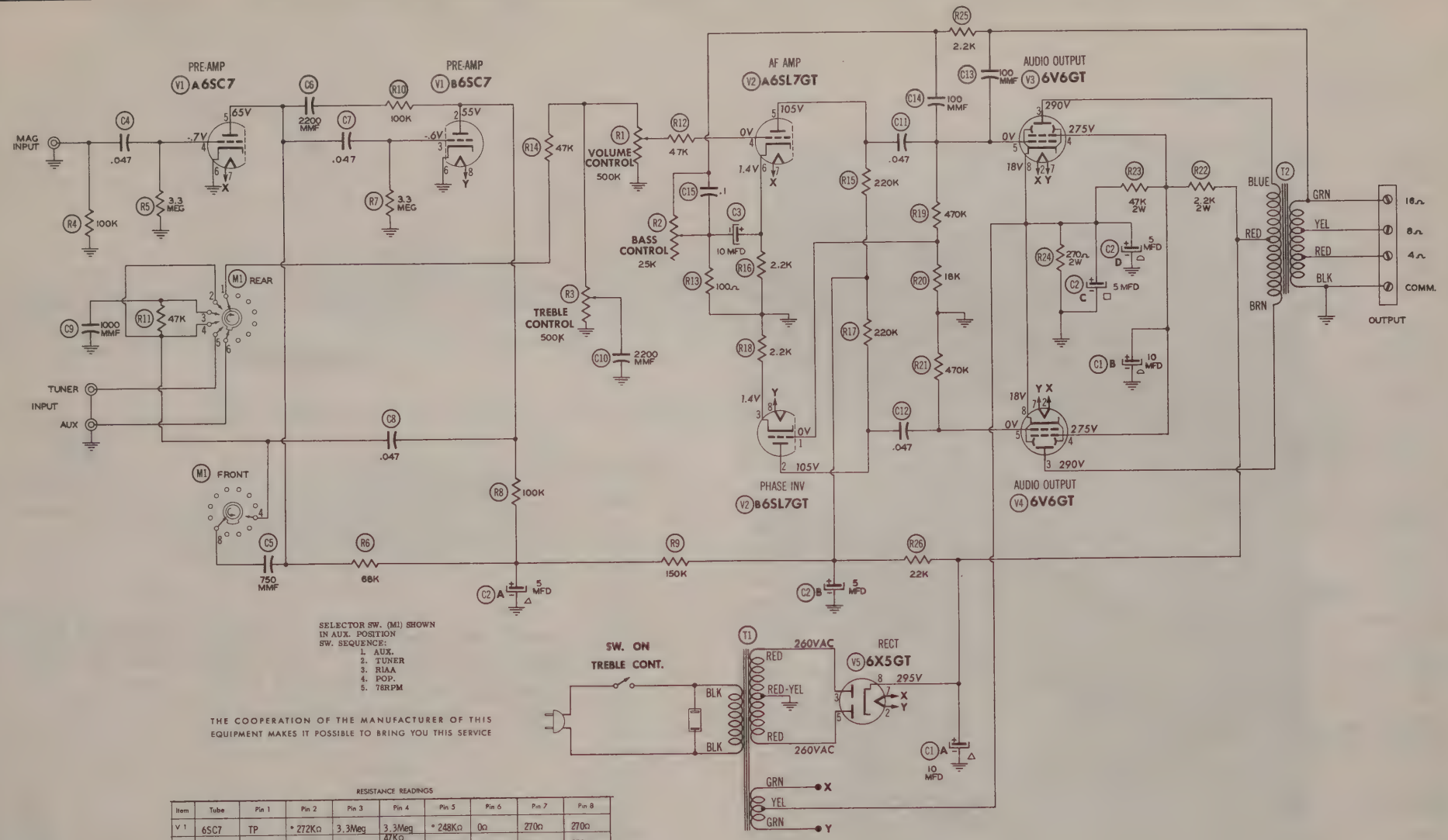
CHASSIS—BOTTOM VIEW



SET 316 FOLDER 6

CHALLENGER MODEL HF8A

CHALLENGER MODEL HF8A



SELECTOR SW. (M1) SHOWN IN AUX. POSITION
SW. SEQUENCE:
1. AUX.
2. TUNER
3. RIAA
4. POP.
5. 78RPM

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SC7	TP	* 272KΩ	3.3Meg	3.3Meg	* 248KΩ	0Ω	270Ω	270Ω
V 2	6SL7GT	18KΩ	* 242KΩ	2.2KΩ	47KΩ ** 547KΩ	* 242KΩ	2.2KΩ	270Ω	270Ω
V 3	6V6GT	NC	270Ω	* 200Ω	* 2.2KΩ	488KΩ	TP	270Ω	270Ω
V 4	6V6GT	TP	270Ω	* 200Ω	* 2.2KΩ	470KΩ	TP	270Ω	270Ω
V 5	6X5GT	NC	270Ω	75Ω	NC	75Ω	NC	270Ω	50KΩ

* MEASURED FROM PIN 8 OF V5.
** VOLUME CONTROL SET AT MAXIMUM.
NC-NO CONNECTION.
TP-TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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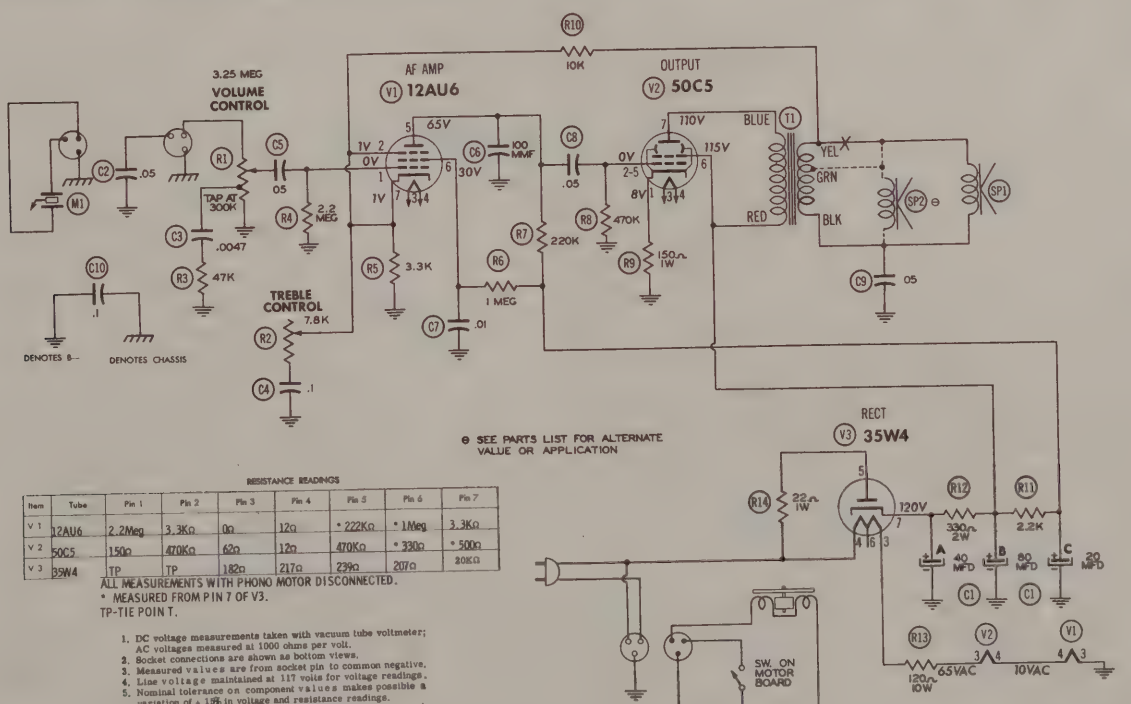
COLUMBIA RECORDS MODELS 314, 320

COLUMBIA RECORDS MODELS 314, 320

TRADE NAME	Columbia Records Models 314, 320
MANUFACTURER	Columbia Records, 799 Seventh Ave., New York 19, N.Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AU6 AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .23 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER-SEE SIMILAR V-M MODEL 950—PHOTOFACT SET SET #216-FOLDER #11 OR RECORD CHANGER MANUAL CM-5



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	2.2Meg	3.3KΩ	0Ω	12Ω	* 222KΩ	* 1Meg	3.3KΩ
V 2	50C5	150Ω	470KΩ	62Ω	12Ω	470KΩ	* 330Ω	* 500Ω
V 3	35W4	TP	TP	182Ω	217Ω	239Ω	207Ω	20KΩ

ALL MEASUREMENTS WITH PHONO MOTOR DISCONNECTED.
* MEASURED FROM PIN 7 OF V3.
TP-TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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316-7

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Columbia Records PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	AF Amplifier	12AU6	12AU6	
V2	Output	50C5	50C5	
V3	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	Columbia Records PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V8040-20	BBRT84215	TCT3117	TDL-804020-150	FMT-1540 FM-1520	TVA-3455
B	80	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	Columbia Records PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	.0047	400		SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C4	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C5	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C6	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	.01	200		BPD-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C8	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C9	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C10	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	Columbia Records PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	3.25Meg	½	VC1				UT-461	Volume-Tapped at 300K
R2A	7800Ω	½	C-V0-902	AB-14	A47-7500-S	Q11-115	U-20	Treble
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	Columbia Records PART No.	IRC PART No.	NOTES
R3	47KΩ	½		BTS-47K	
R4	2.2Meg	½		BTS-2.2Meg	
R5	3300Ω	½		BTS-3300	
R6	1Meg	½		BTS-1Meg	
R7	220KΩ	½		BTS-220K	
R8	470KΩ	½		BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	Columbia Records PART No.	IRC PART No.	NOTES
R9	150Ω	1		BTA-150	
R10	10KΩ	½		BTS-10K	
R11	2200Ω	½		BTS-2200	
R12	330Ω	2	RC33I-7	BTB-330	
R13	120Ω	10	RW121		
R14	22Ω	1			

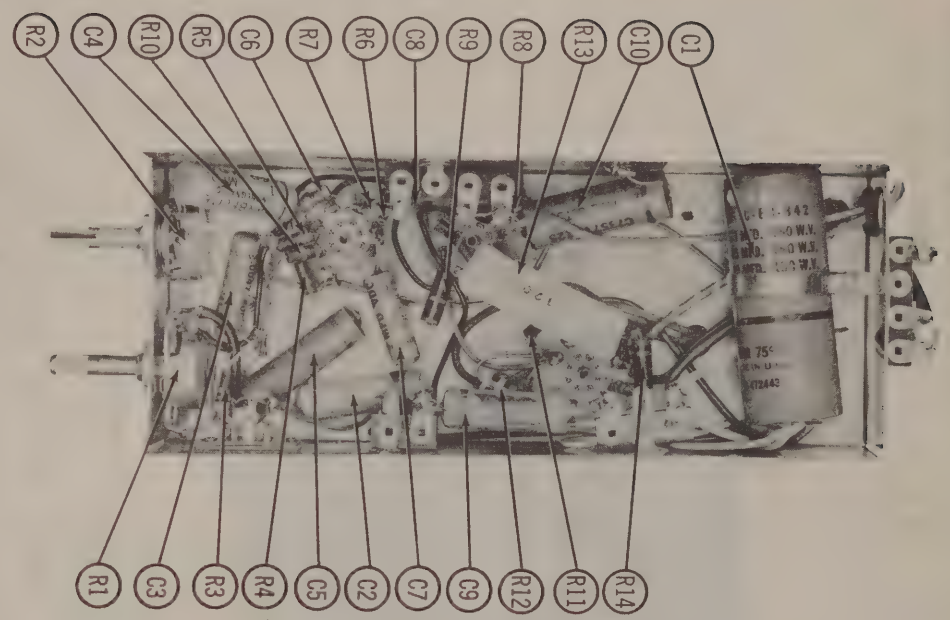
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	Columbia Records PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.3KΩ	3.9Ω Feed Back Tap ② .49Ω	TR-112	Z1001	A-2928	A-3849 ①			① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	Columbia Records PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"x 6"	PM	3.9Ω	SP-48	46A1	227S1	① Two used in parallel in Model 320.
SP2	6"	PM	3.9Ω	SP-67 ①	6A1	229S1	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: Columbia Records PART No.	ASTATIC PART No.: CARTRIDGE	ASTATIC PART No.: NEEDLE	ELECTRO-VOICE PART No.: CARTRIDGE	ELECTRO-VOICE PART No.: NEEDLE	REMARKS
M1	PU-284-0V	90-TB	A-1 and A-3	46T	0-1 or S-1 and 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

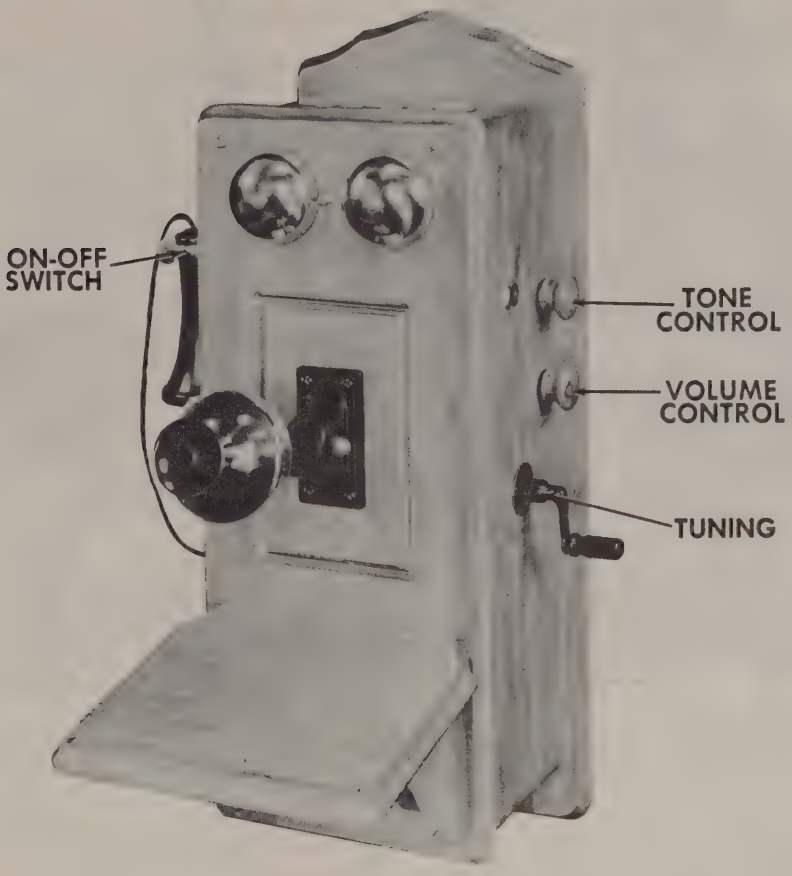
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	Columbia Records PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		† CR-55 or ♦ CR-55D and † CR-55LP or ♦ CR-55LPD	† A-448 or ♦ A-448D and † C-449 or ♦ C-449D	† W-64S and † W-64MGS	† Jewel ♦Diamond

GUILD MODEL 556

GUILD MODEL 556



GUILD MODEL 556

TRADE NAME	Guild Model 556
MANUFACTURER	Guild Radio & Television Co., 460 N. Eucalyptus Ave., Inglewood, Calif.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 (or) 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1720KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.02MFD	High side to antenna stator lug on tuning gang. Low side to chassis.	455KC (400% Mod.)	Tuning gang fully closed	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. Repeat process until no further increase is noted.
2.	100MMF	High side to antenna clip on antenna. Low side to chassis.	1600KC	1600KC	"	A5	RF and Osc. trimmer adjustment should be made with chassis installed in cabinet due to dial location. Two removable plugs are located on top of cabinet. Remove plug. Adjust A5 for maximum output.
3.	"	"	1500KC	Tune to 1500KC signal	"	A6	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

GUILD MODEL 556

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		GUILD PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	12AT6 may be used as an alternate
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	GUILD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■ 50	150		AFH2-15	B015	FP213	TM-5030-150	D-065	TVL-2432
B	▲ 30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	GUILD PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C3	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C5	200			SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C6	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C7A	5000									
B	250		♦	♦PA-112-1	♦PC-70	♦112TM1	♦1406-01		♦ T-3	
C										
C8	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C9	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C10	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C11	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	

♦ Items C7A, C7B, C7C, R8A, R8B are combined in one unit. When replacing items separately, C7B and C7C should total 250MMF. In some versions C7A, C7B and C7C are separate items.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	GUILD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½		B-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
R2A	500KΩ	½		B-60	A47-500K-Z	Q13-133	U-48	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GUILD PART No.	IRC PART No.	
R3	22KΩ	½		BTS-22K	
R4	220Ω	½		BTS-220	
R5	2.2Meg	½		BTS-2.2Meg	
R6	100Ω	½		BTS-100	
R7	6.8Meg	½		BTS-6.8Meg	

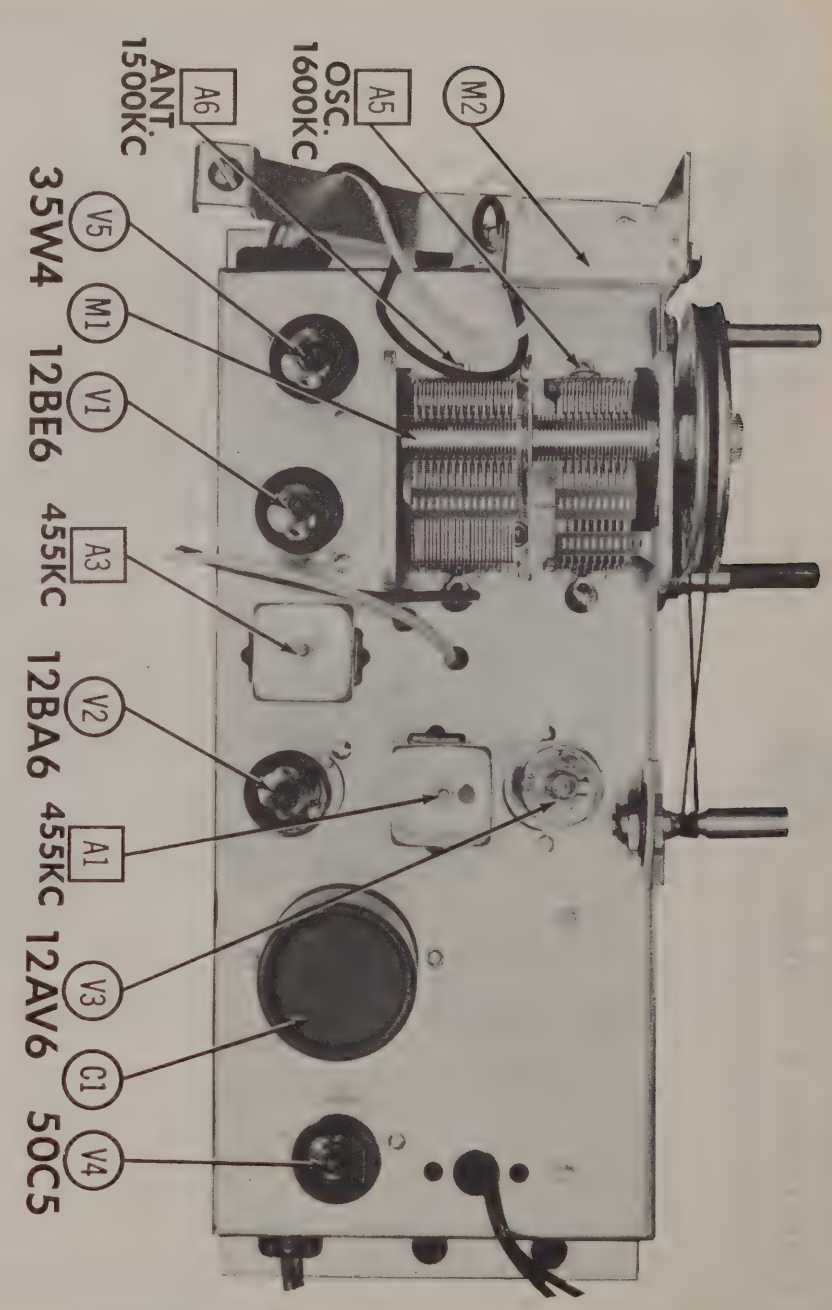
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GUILD PART No.	IRC PART No.	
R8A	270KΩ		♦	BTS-270K	
B	560KΩ			BTS-560K	
R9	150Ω	½		BTS-150	
R10	1000Ω	1		BTA-1000	
R11	150Ω	½		BTS-150	Note 1

Note 1. Not used in some versions.
♦ Items R8A, R8B, C7A, C7B, C7C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	GUILD PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.6KΩ	3.5Ω		Z1001	A3025 ①	A3876	22S45	S-1X	① Drill one new mtg. hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

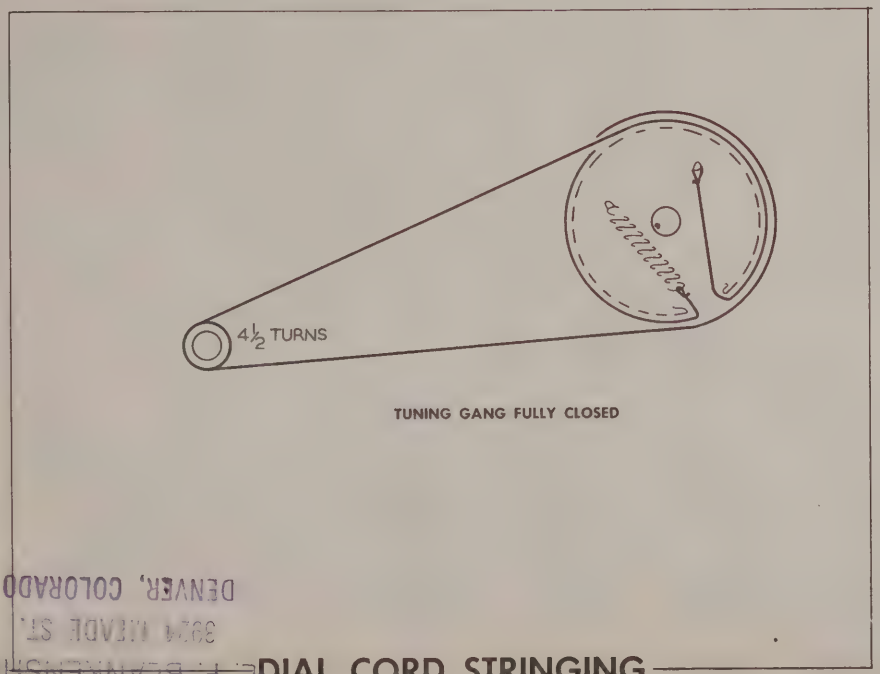
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	GUILD PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	3.5Ω		5A07	205S2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	GUILD PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.8Ω						Tapped ⓐ .7Ω
L2	Osc. Coil	1Ω	9Ω		14-1074	BC-394	70-Osc.	
L3	Input IF	14Ω	14Ω	TRI-455-1	16-6758	BC-352	12-C1	
L4	Output IF	14Ω	14Ω	TRI-455-2	16-6758	BC-353	12-C2	

MISCELLANEOUS

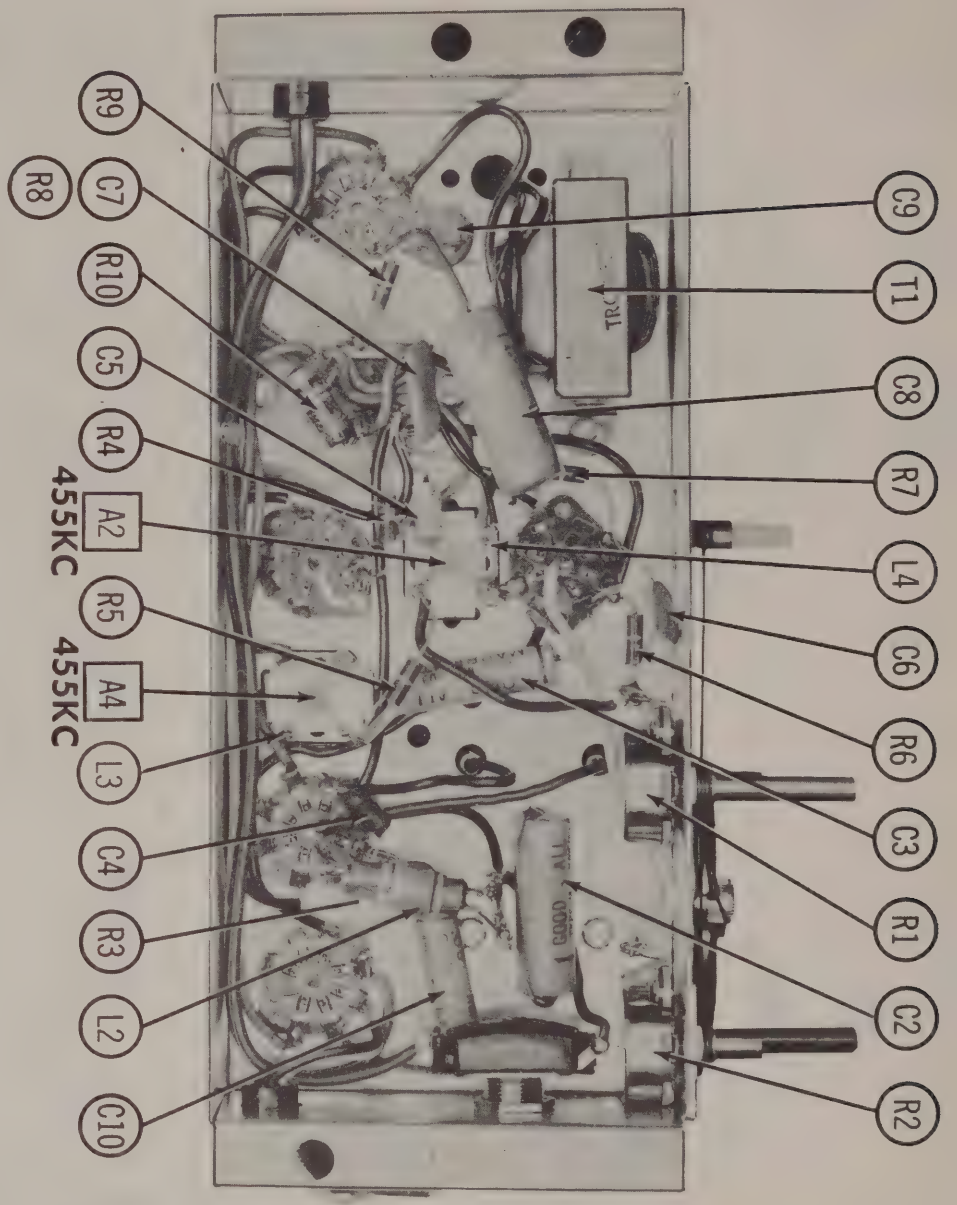
ITEM No.	PART NAME	GUILD PART No.	NOTES
M1	Dial Light		#44
M2	Tuning Cap.	2080	2 Gang (30-515MMF, 24-190MMF)



TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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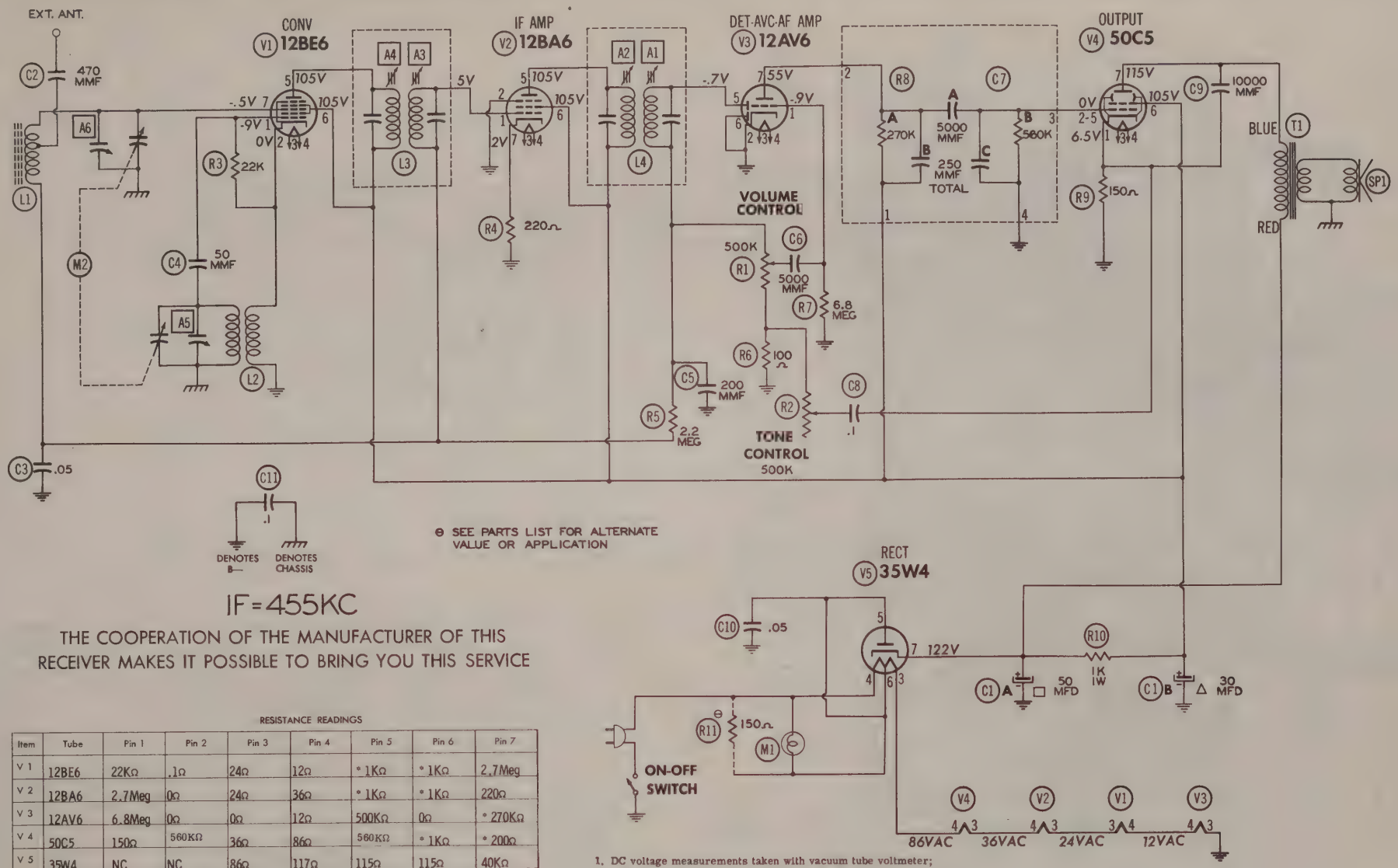
3924 MEADE ST.
DENVER, COLORADO



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.1Ω	24Ω	12Ω	* 1KΩ	* 1KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	* 1KΩ	* 1KΩ	220Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	0Ω	* 270KΩ
V 4	50C5	150Ω	560KΩ	36Ω	86Ω	560KΩ	* 1KΩ	* 200Ω
V 5	35W4	NC	NC	86Ω	117Ω	115Ω	115Ω	40KΩ

* MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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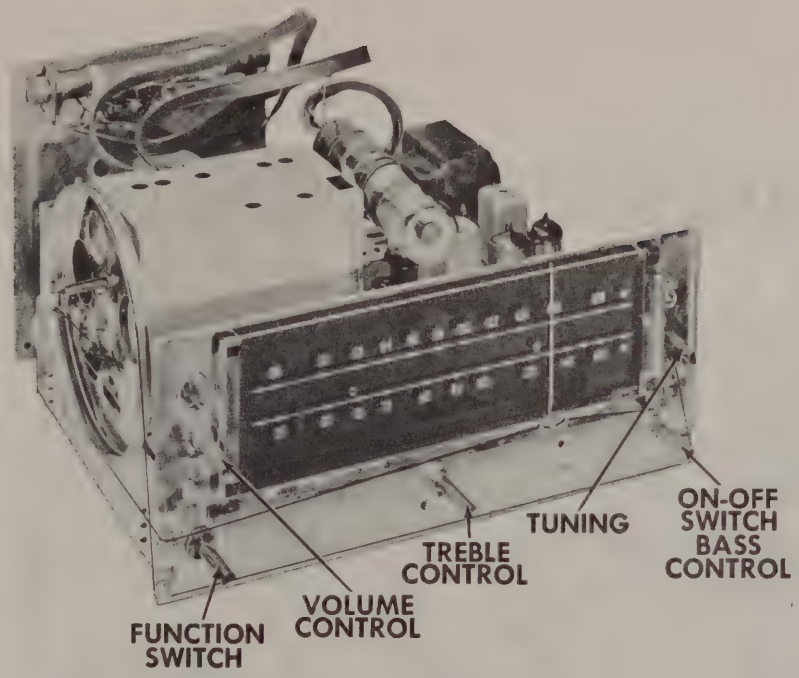
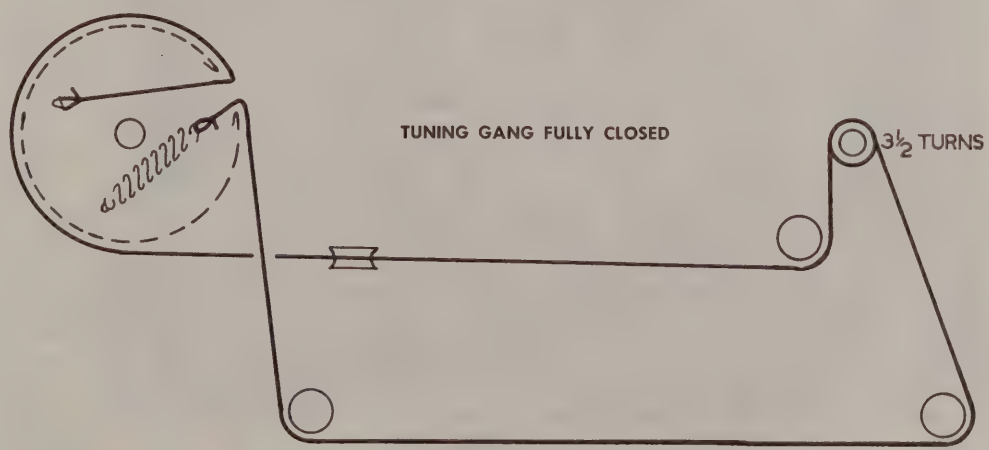
MAGNAVOX
CHASSIS CR-712AA



TRADE NAME	Magnavox Chassis CR-712AA
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne, Ind.
TYPE SET	Externally Powered AM-FM Superheterodyne Tuner
TUBES (Eight)	Types 6BZ6 FM RF Amp., 6U8 FM Mixer-Osc., 6BE6 AM Conv., 6BA6 1st IF Amp., 6BA6 2nd FM IF Amp., 6AL5 Ratio Det., 12AX7 AF Amp.-Cathode Follow, 6E5 Tuning Indicator
POWER SUPPLY	Power Obtained Externally
TUNING RANGE-BROADCAST	540KC-1620KC FREQ. MOD. 88MC-108MC



DIAL CORD STRINGING

PROPERTY OF
[illegible] TOWNSHIP
[illegible] EDGE ST.
[illegible], COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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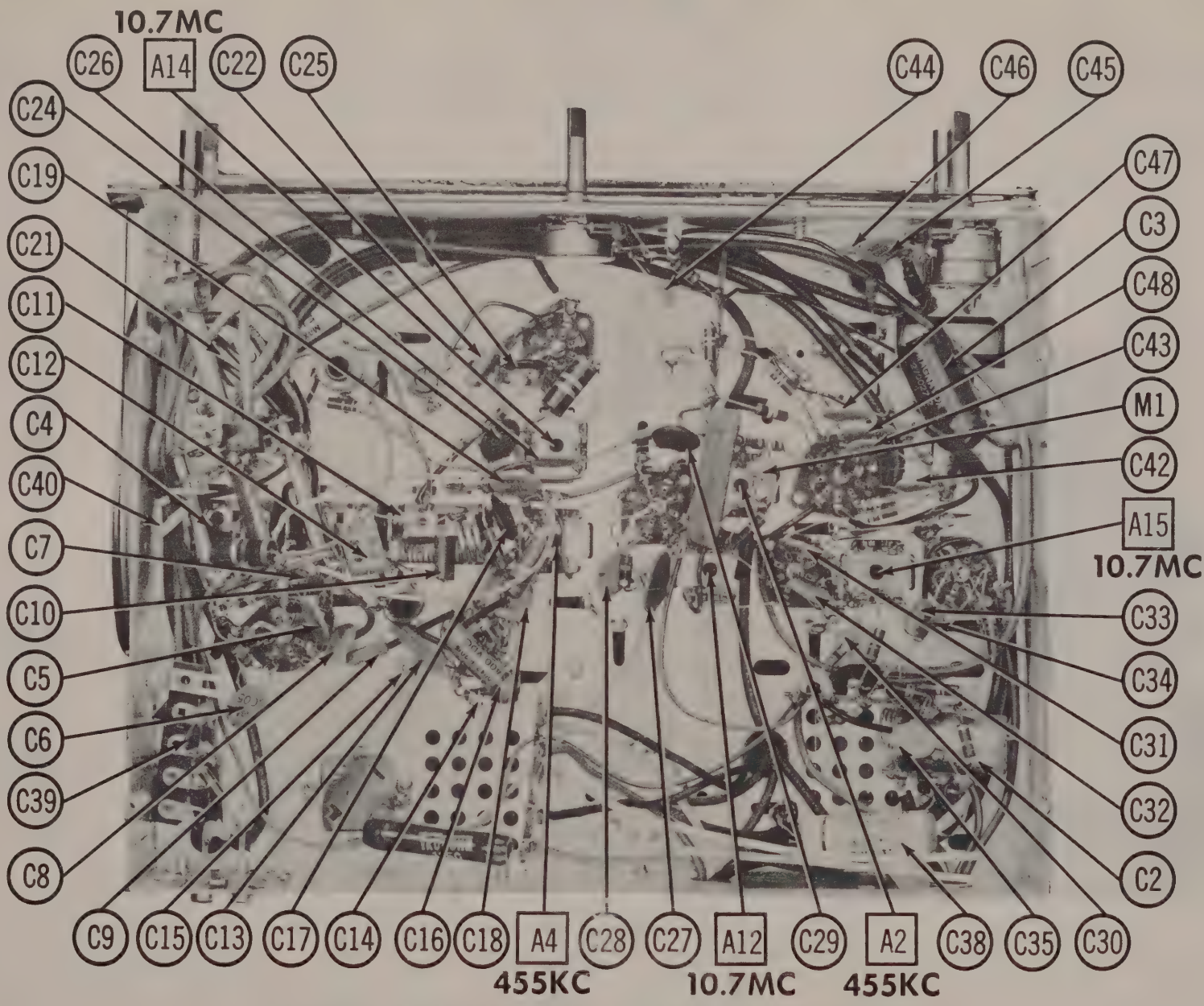
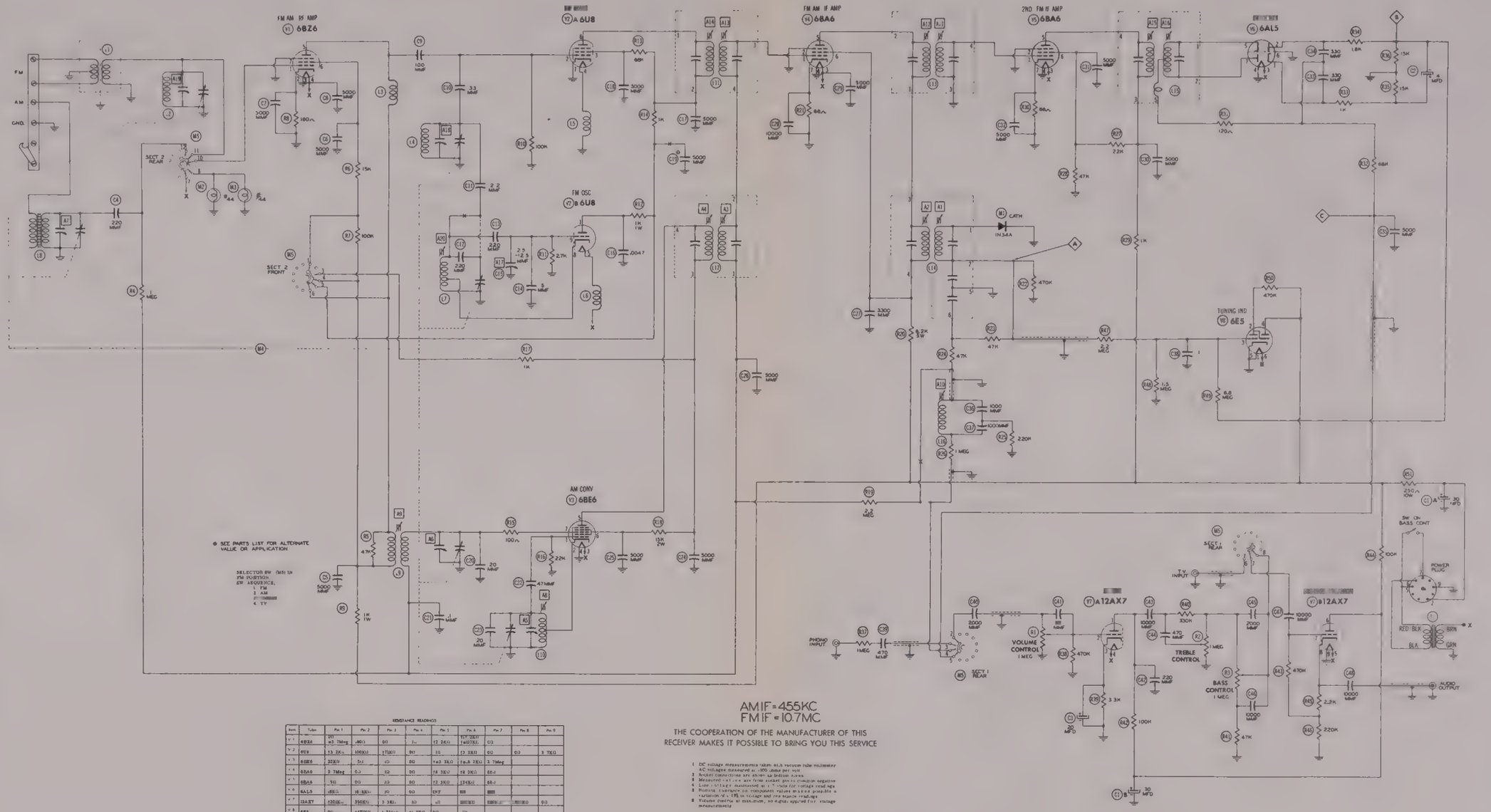


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V-1	6BZ6	0Ω m3 .7Meg	.68Ω	0Ω	3...	12.2KΩ	TV: 22KΩ FM/TRK: 0Ω	0Ω		
V-2	6U8	13.2KΩ	100KΩ	375KΩ	0Ω	1Ω	12.2KΩ	0Ω	0Ω	3.7KΩ
V-3	6BE6	32KΩ	5Ω	1Ω	0Ω	440.2KΩ	164.8.2KΩ	3.7Meg		
V-4	6BA6	3.7Meg	0Ω	1Ω	0Ω	18.3KΩ	18.3KΩ	68Ω		
V-5	6BA6	5Ω	0Ω	1Ω	0Ω	12.2KΩ	174KΩ	68Ω		
V-6	6AL5	68Ω	18.4KΩ	1Ω	0Ω	ENT	[illegible]	[illegible]		
V-7	12AX7	420KΩ	350KΩ	3.3KΩ	1Ω	1Ω	[illegible]	[illegible]	[illegible]	0Ω
V-8	6E5	0Ω	447KΩ	1.3Meg	11.7KΩ	0Ω	1Ω			

AM IF = 455KC
FM IF = 10.7MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter
2. AC voltages measured at 1000 ohms per volt
3. Socket connections are shown as bottom view
4. Measured values are from socket pins to common negative
5. Line voltage maintained at 117 volts for voltage readings
6. Marking tolerance on components values makes possible a variation of ± 10% in voltage and resistance readings
7. Volume control at maximum, no signal applied for voltage measurements

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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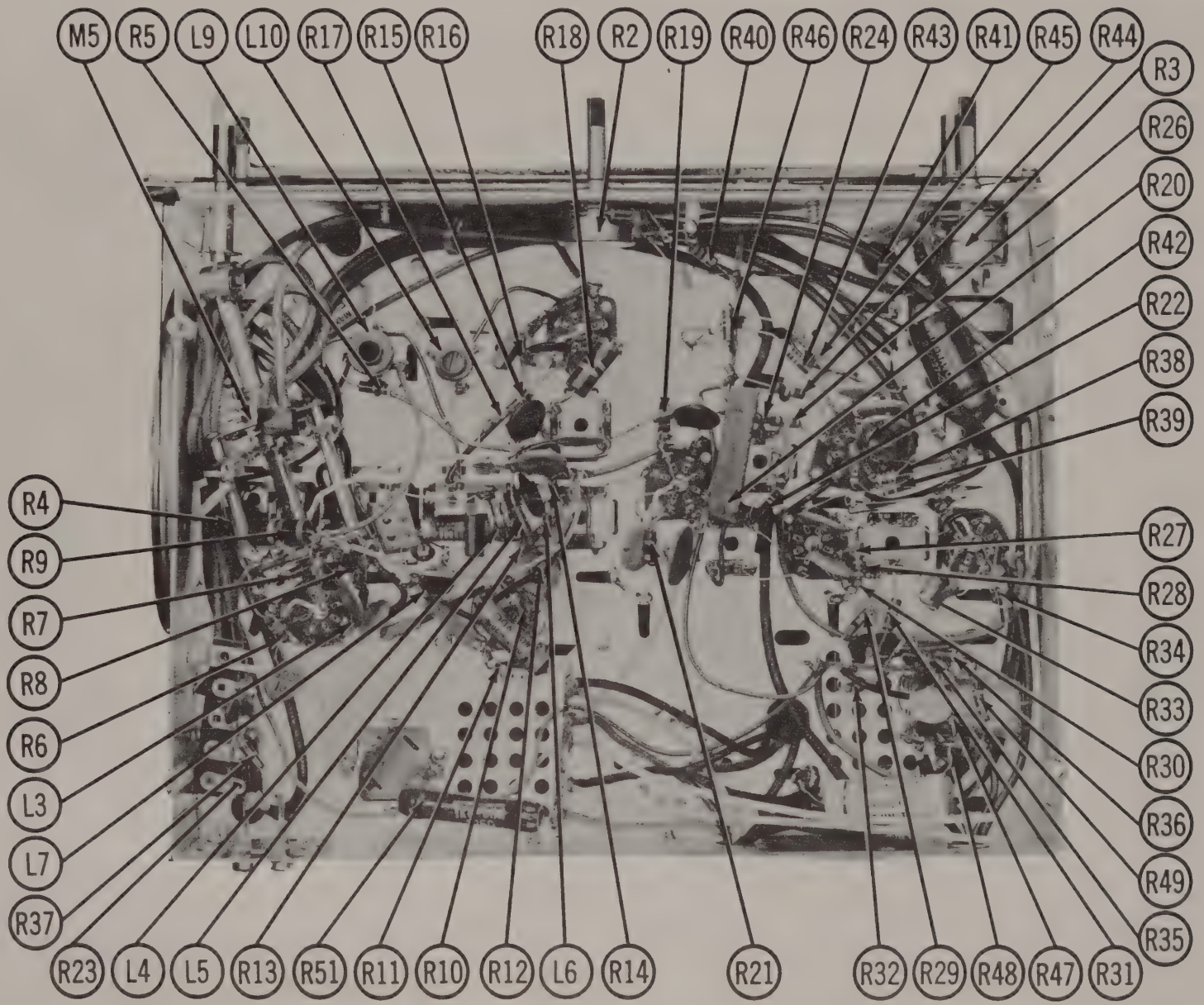


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MAGNAVOX
CHASSIS CR-712AA

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a. 1MFD capacitor in series with low side of signal generator and B-.
With tuning gang fully closed, align pointer with last dial calibration mark at low frequency end of dial.
Treble control to sharp tune.
Keep signal generator output as low as possible.

AM ALIGNMENT

Set band switch to AM Position.
Check dial pointer.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400~Mod.)	AM	1000KC	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	10MMF	High side to AM antenna terminal. Low side to chassis.	1400KC	"	1400KC	"	A5, A6, A7	"
3.	"	"	600KC	"	600KC	"	A8, A9	"

10KC WHISTLE FILTER ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	Direct	High side to AM antenna terminal. Low side to chassis.	10KC	AM		AC probe across audio output.	A10	Adjust for MINIMUM deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set band switch to FM Position.
Use 1Meg resistor in series with high side of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 5 (plate) of 6BZ6 (V1). Low side to chassis.	10.7MC (Unmod.)	FM	Low frequency end of dial	DC probe thru 1Meg to point (B). Common to chassis.	A11, A12, A13, A14, A15	Adjust for maximum deflection.
6.	"	"	"	"	"	DC probe thru 1Meg to point (C). Common to chassis.	A16	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 5 & 6 until no further improvement is noted.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.
Use 1Meg resistor in series with high side of scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 5 (plate) of 6BZ6 (V1). Low side thru 1KΩ to chassis.	10.7MC (450KC Swp)	FM	Low frequency end of dial.	Vert. Amp. thru 1Meg to point (B). Low side to chassis.	A11, A12, A13, A14, A15	Disconnect stabilizing capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
6.	"	"	"	"	"	Vert. Amp. thru 1Meg to point (C). Low side to chassis.	A16	Reconnect stabilizing capacitor (C2). Adjust so that 10.7MC occurs at center of crossover lines, similar to Fig. 2. If necessary, retouch A15 & A16 for response (Fig. 2) with 10.625MC, 10.7MC and 10.775MC markers as shown.

FM RF ALIGNMENT

Use 1Meg resistor in series with high side of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Direct	High side thru 120Ω to FM antenna terminal. Low side thru 150Ω to chassis.	107MC	FM	107MC	DC probe thru 1Meg to point (B). Common to chassis.	A17, A18, A19	Adjust for maximum deflection.
8.	"	"	89MC	"	89MC	"	A20	"

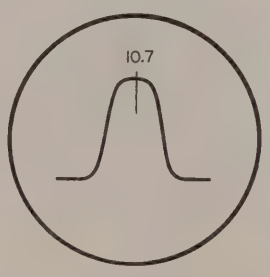


FIG. 1

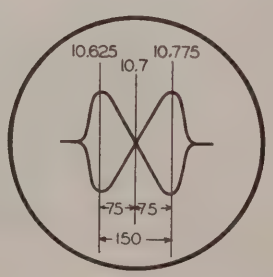


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	STANDARD REPLACEMENT	
V1	FM RF Amplifier	6BZ6	6BZ6	
V2	FM Mixer-Osc.	6U8	6U8	
V3	AM Converter	6BE6	6BE6	
V4	1st FM-AM IF Amp.	6BA6	6BA6	
V5	2nd FM IF Amp.	6BA6	6BA6	
V6	Ratio Detector	6AL5	6AL5	
V7	AF Amplifier-Cathode Follower	12AX7	12AX7	
V8	Tuning Indicator	6E5	6E5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	30	450	270021-58	AFH2-54	B043	FP237	TM-D30-450	D-225	TVL-2759
B	30	450							
C2	4	50	270027-27	PRS150V4	BR505	TC30	TD-4-50	MT-1504	TVA-1303
C3	20	25	270027-2	PRS25V25	BR202	TC45	TD-25-25	FM-0225	TVA-1205

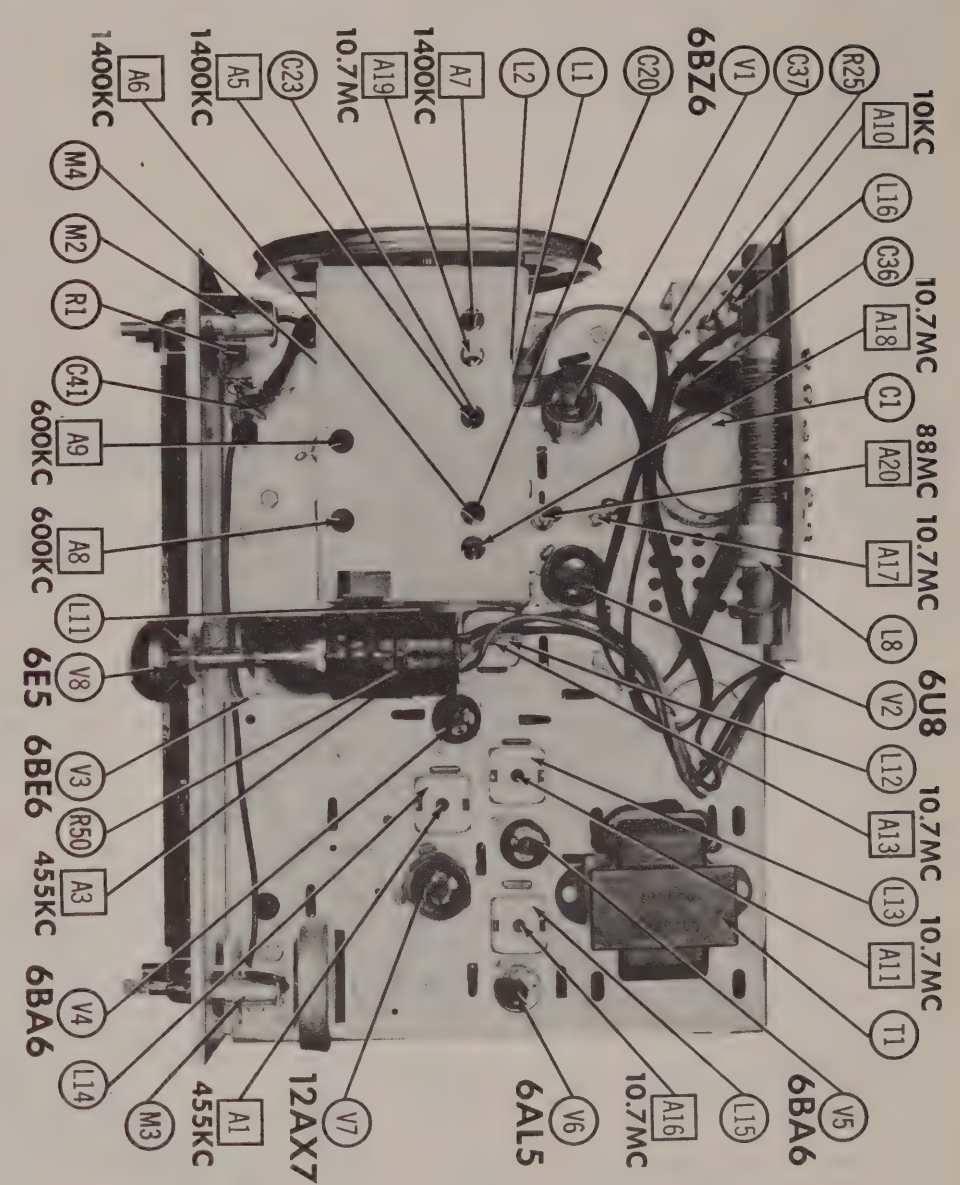
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	220	500	250187-57	NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C5	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C6	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C7	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C8	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C9	100	500	250187-53	NPO-SI100	TCZ-100	5R5T1	NPO-337-101	MCB235	MS-31	
C10	33	500	250187-47	NPO-SI33	TCZ-33	5R5Q33	NPOL-330	ZT-5433	MS-433	
C11	2.2		250221-118	NPO-SI2.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C12	220	500	250159-55	NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C13	220	500	250159-55	NPO-SI220	TCZ-220	5R5T22	NPO-335-221		MS-322	
C14	5		250088-138							
C15	2.5-12.5		250188-9							
C16	.0047	400	250211-5	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C17	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C18	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C19	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	Note 1
C20	20	500	250187-5	NPO-SI20	TCZ-20	5R5Q2	NPOK-200	ZT-542	MS-42	
C21	.1	200	250202-13	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C22	47	500	250187-49	NPO-SI47	TCZ-47	5R5Q47	NPO-338-470	ZT-5447	MS-447	
C23	20	500	250187-5	NPO-SI20	TCZ-20	5R5Q2	NPOK-200	ZT-542	MS-42	
C24	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C25	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C26	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C27	3300		250175-8	BPD-0033	DD-332	K077	811-0033	UC-5233	5HK-D33	
C28	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C29	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C30	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C31	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C32	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C33	330		250207-49	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C34	330		250207-49	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C35	5000		250175-1	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C36	1000		250288-354	1464-001		1R5D1	811-102	MCE255	MS-21	
C37	1000		250288-354	1464-001		1R5D1	811-102	MCE255	MS-21	
C38	.1	200	250202-13	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C39	470		250218-6	BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C40	2000		250218-16	BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C41	47		250218-17	N750-DI47	TCN-47	N033	N750K-470	NT-5447	5TCU-Q47	
C42	220		250218-5	BPD-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C43	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-D1	
C44	470		250218-6	BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C45	2000		250218-16	BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C46	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C47	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C48	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	

Note 1. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	220072-25	B-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
R2A	1Meg	½	220072-26	B-68		Q17-137	U-52	Treble
B	Shaft		Not Req.	Not Req.		Not Req.	Not Req.	Attach to R2A.
R3A	1Meg	½	220073-20	AB-70	A47-1Meg-Z	Q13-137	U-53	Bass
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R3A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R3A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R4	1Meg	½	230104-98	BTS-1Meg	
R5	4700Ω	½	230104-70	BTS-4700	
R6	15KΩ	½	230104-76	BTS-15K	
R7	100KΩ	½	230104-86	BTS-100K	
R8	180Ω	½	230104-53	BTS-180	
R9	1000Ω	2	230106-62	BTB-1000	
R10	100KΩ	½	230104-86	BTS-100K	
R11	2700Ω	½	230104-67	BTS-2700	
R12	1000Ω	1	230105-62	BTA-1000	
R13	68KΩ	½	230104-84	BTS-68K	
R14	1000Ω	½	230104-62	BTS-1000	
R15	100Ω	½	230104-50	BTS-100	
R16	22KΩ	½	230104-78	BTS-22K	
R17	1000Ω	½	230104-62	BTS-1000	
R18	15KΩ	2	230106-76	BTB-15K	
R19	2.2Meg	½	230104-102	BTS-2.2Meg	
R20	8200Ω	5	240071-13	PW10-8200	
R21	68Ω	½	230106-48	BTS-68	
R22	470KΩ	½	230104-94	BTS-470K	
R23	47KΩ	½	230104-82	BTS-47K	
R24	47KΩ	½	230104-82	BTS-47K	
R25	220KΩ	½	230104-90	BTS-220K	
R26	1Meg	½	230104-98	BTS-1Meg	
R27	22KΩ	½	230104-78	BTS-22K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R28	47KΩ	½	230104-82	BTS-47K	
R29	1000Ω	½	230104-62	BTS-1000	
R30	68Ω	½	230104-48	BTS-68	
R31	120Ω	½	230104-51	BTS-120	
R32	68KΩ	½	230104-84	BTS-68K	
R33	1000Ω	½	230104-62	BTS-1000	
R34	1800Ω	½	230104-65	BTS-1800	
R35	15KΩ	½	230104-76	BTS-15K	
R36	15KΩ	½	230104-76	BTS-15K	
R37	1Meg	½	230104-98	BTS-1Meg	
R38	470KΩ	½	230104-94	BTS-470K	
R39	3300Ω	½	230104-68	BTS-3300	
R40	330KΩ	½	230104-92	BTS-330K	
R41	47KΩ	½	230104-82	BTS-47K	
R42	100KΩ	½	230104-86	BTS-100K	
R43	470KΩ	½	230104-94	BTS-470K	
R44	100KΩ	½	230104-86	BTS-100K	
R45	2200Ω	½	230104-66	BTS-2200	
R46	220KΩ	½	230104-90	BTS-220K	
R47	2.2Meg	½	230104-102	BTS-2.2Meg	
R48	1.5Meg	½	230104-100	BTS-1.5Meg	
R49	6.8Meg	½	230104-108	BTS-6.8Meg	
R50	470KΩ	½	230104-94	BTS-470K	
R51	1250Ω	10	240021-45	1 3/4A-1250	

TRANSFORMER (FILAMENT)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .17A	6.3VAC @ 2.6A			320258-1	F5512				

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Trans	0Ω CT	0Ω	360491-2				
L2	FM Ant. Coil	0Ω		360629-1				
L3	RF Coil	.1Ω		360522-9	19-1002		4606	2 Microhenries
L4	FM RF Coil	0Ω		360629-1				
L5	Fil. Choke	.1Ω		360522-9	19-1002		4606	2 Microhenries
L6	Fil. Choke	.1Ω		360522-9	19-1002		4606	2 Microhenries
L7	FM Osc. Coil	0Ω		360628-1				
L8	AM Ant. Coil	0Ω	.5Ω	460894-1				
L9	AM RF Coil	20Ω	3.7Ω	360348-2			A-5495-RF*	
L10	AM Osc. Coil	5.3Ω		360407-2	14-1033	BC-387 ■	71-Osc. ▲	Tapped @ .4Ω
L11	1st FM IF	.6Ω	.6Ω	360626-1	16-3487	FM-254	1463	
L12	1st AM IF	15Ω	15Ω	360611-1	16-6758	BC-352	12-C1	
L13	2nd FM IF	.6Ω	.6Ω	360626-1	16-3487	FM-254	1463	
L14	2nd AM IF	27Ω	27Ω	360625-1	16-6770	BC-355	12-C6	
L15	Ratio Det.	4.4Ω	1.5Ω CT	360627-1	17-3498	FM-255	1465	Tertiary Winding=.5Ω
L16	10KC Filter	350Ω		360621-1				

* Enlarge mounting hole.
■ Use secondary winding only.
▲ Use primary winding only.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	SYLVANIA PART No.	
M1	1N34A	530030-2	1N54A, 1N58A, 1N38A, 1N55A	AM Audio Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M2	Dial Light	180161-6	#44
M3	Dial Light	180161-6	#44
M4	Tuning Cap.	260133-1	6 Gang (AM Sections: 19-535MMF, 19-535MMF, 15-185MMF)
M5	Switch	160255-1	Bandswitch (Rotary-Wafer Type)
	Dial Glass	150419-1	
	Dial Pointer	102448-2	

PHOTOFACT* Folder

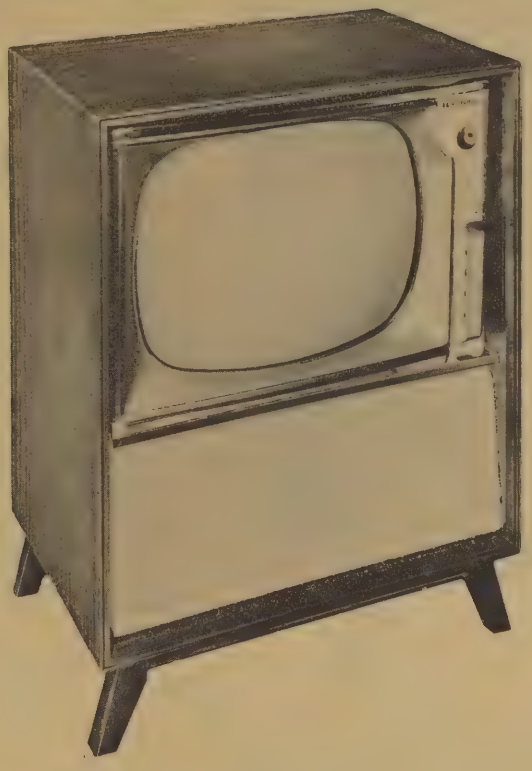
*TRADE MARK

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . unless it has been purchased as part of a complete volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K43, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24T4, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)



MOTOROLA MODEL 21K41R

TRADE NAME	Motorola	MODELS	CHASSIS
		Y21C4, Y21C4B, Y21K41, Y21K41B, Y21K42, Y21K42B, Y21K43, Y21K43B, Y21K44B, Y21K44W, Y21K45, Y24K10, Y24K10B, Y24K11, Y24K11B, Y24T4, Y24T4B	TS-533Y
		21C4, 21C4B, 21K41, 21K41B, 21K41R, 21K42, 21K42B, 21K43, 21K43B, 21K44B, 21K44W, 21K45, 24K10, 24K0B, 24K11, 24K11B, 24T4, 24T4B	TS-533
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 2 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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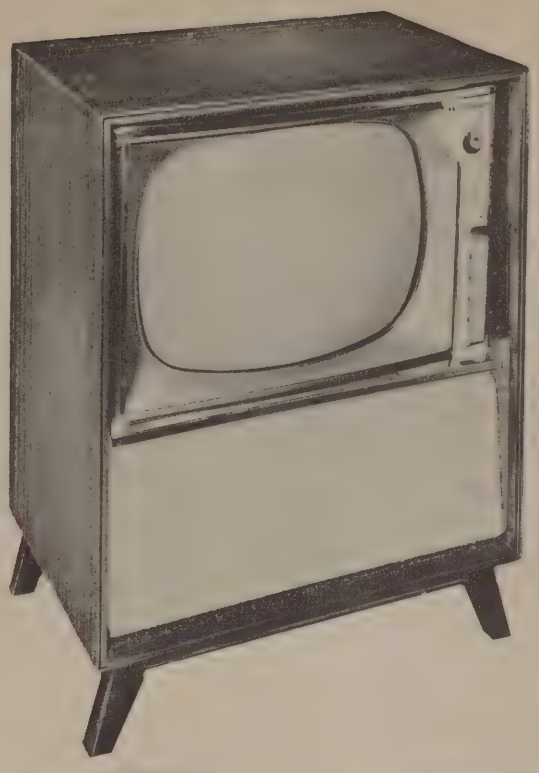
DATE 5-56 SET 316 FOLDER 10

PROPERTY OF L. F. BLANKENSHIP 3004 MEADE ST. DENVER, COLO.

PHOTOFACT* Folder
*TRADE MARK

PROPERTY OF
L. F. BLANKENSHIP
DENVER, COLORADO

MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K43, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24T4, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)



DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 wood screws and 1 metal screw. Remove rear cover, notice manner in which tuner leads plug into local-distance switch.
2. Disconnect speaker leads.
3. Remove 2 wood screws holding fibre L-shaped tie-down strip in the upper portion of the chassis.
4. Remove the channel selector and fine tuning knobs, remove phillips head screw exposed by knob removal.
5. Remove escutcheon plate by pulling the left side out and unhooking from the right side.
6. Remove the phillips head screw at the extreme top right hand side of the cabinet (exposed by removal of escutcheon plate).
7. Detach snap-on molding running vertically at the left hand side of the safety glass (Using the L-shaped key provided).
8. Remove phillips head screw at the extreme left hand side of the cabinet (exposed by molding removal).
9. Remove 4 wood screws from lower trim molding.
10. Remove 4 chassis bottom pan bolts. (Do not remove the bolts holding chassis to bottom pan).
11. Remove the entire front of cabinet with bottom pan, chassis and picture tube attached thru the front of the cabinet.
12. Remove 4 speaker nuts. Remove speaker.

MODELS	CHASSIS
Y21C4, Y21C4B, Y21K41, Y21K41B, Y21K42, Y21K42B, Y21K43, Y21K43B, Y21K44B, Y21K44W, Y21K45, Y24K10, Y24K10B, Y24K11, Y24K11B, Y24T4, Y24T4B	TS-533Y
21C4, 21C4B, 21K41, 21K41B, 21K41R, 21K42, 21K42B, 21K43, 21K43B, 21K44B, 21K44W, 21K45, 24K10, 24K0B, 24K11, 24K11B, 24T4, 24T4B	TS-533

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove snap-on molding, running vertically at the left-hand side of safety glass. (Use fibre L-shaped key provided). Remove phillips head screws now exposed and remove glass retainer strip. Remove channel selector and fine tuning knobs. Remove phillips head screw now visible and remove metal escutcheon. Remove safety glass by shifting to the left. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal oscillator may be adjusted from the rear of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A11) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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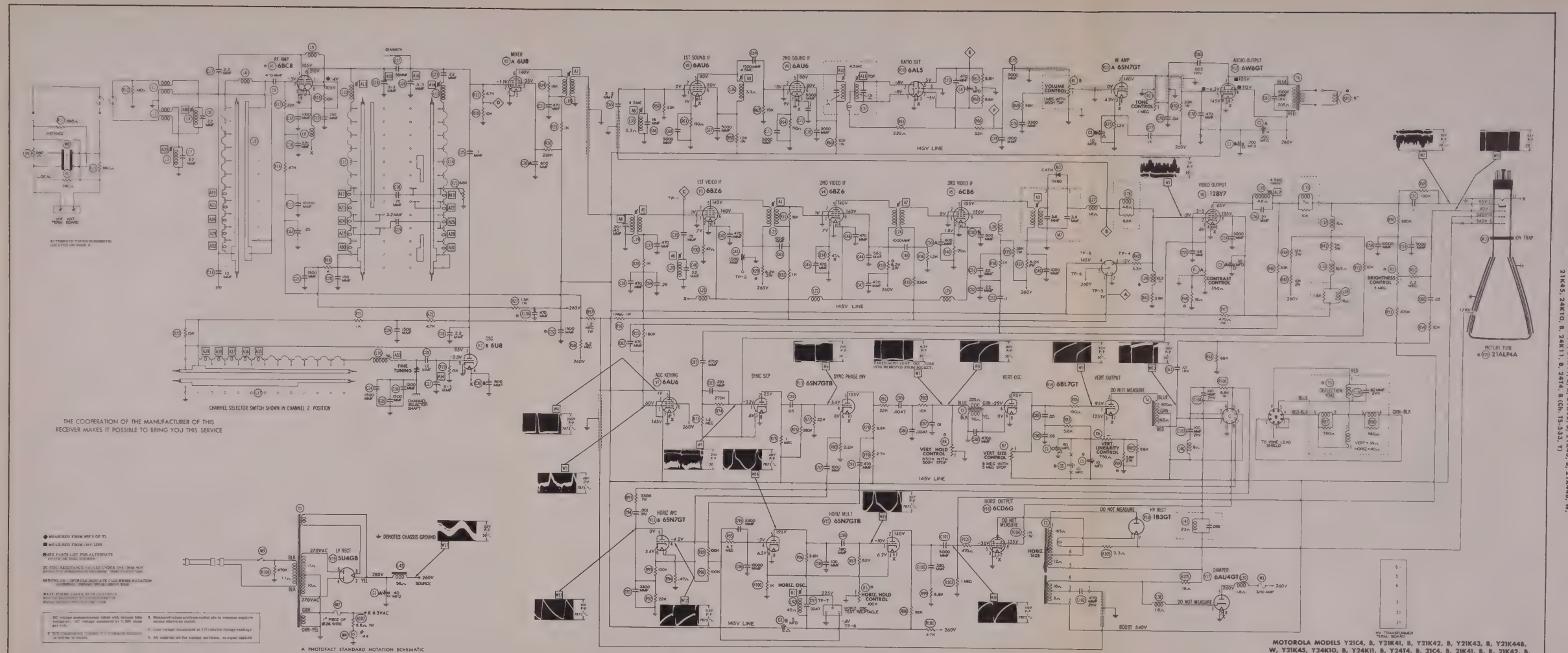
RF AMP V1 6BC8
MIXER V2 A 6U8
OSC V7 B 6U8
1ST SOUND IF V3 6AU6
2ND SOUND IF V5 6AU6
RATIO DET V6 6AL5
AF AMP V11 A 6SN7GT
AUDIO OUTPUT V12 6W6GT
1ST VIDEO IF V3 6BZ6
2ND VIDEO IF V4 6BZ6
3RD VIDEO IF V5 6CB6
VIDEO OUTPUT V6 12BY7
PICTURE TUBE V20 21ALP4A
ION TRAP
AGC KEYING V7 6AU6
SYNC SEP
SYNC PHASE INV V11 6SN7GTB
VERT OSC
VERT OUTPUT V14 6BL7GT
HORIZ AFC V11 B 6SN7GT
HORIZ MULT V15 6SN7GTB
HORIZ OUTPUT V16 6CD6G
HV RECT V10 1B3GT
DAMPER V17 6AU4GT
LV RECT V19 5U4GB
VOLUME CONTROL 1 MEG WITH 300K TAP
TONE CONTROL 1 MEG
CONTRAST CONTROL 350Ω
BRIGHTNESS CONTROL 5 MEG
VERT HOLD CONTROL 850K WITH 500K STOP
VERT SIZE CONTROL 8 MEG WITH 5 MEG STOP
VERT LINEARITY CONTROL 750Ω
HORIZ HOLD CONTROL 100K
HORIZ SIZE
HORIZ. OSC.
FINE TUNING
CHANNEL SELECTOR SHAFT
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 2 POSITION
145V LINE
DO NOT MEASURE
DEFLECTION YOKE
TO YOKE LEAD SHIELD
BOOST 540V
DENOTES CHASSIS GROUND
270VAC
280V
260V SOURCE
6.3VAC
1 PIECE OF #26 WIRE
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 8
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
◆ MEASURED FROM PIN 8 OF V1
■ MEASURED FROM +B9 LINE
● SEE PARTS LIST FOR ALTERNATE
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION
WAVE FORMS TAKEN WITH CONTROLS
DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
Measured values are from socket pin to common negative unless otherwise noted.
Line voltage maintained at 117 volts for voltage readings.
All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K43, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24T4, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)

MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K43, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24T4, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L20	41.25MC Trap	0Ω		24B736966		TV-131	6225	Core Part No. 76A735943
L21	Fil. Choke	0Ω		24K730391	19-1001	TV-189	4604	1.3 Microhenries
L22	2nd Video IF	.1Ω	.1Ω	24B736267	17-4522	TV-130	6219	Core Part No. 76A735943
L23	Fil. Choke	0Ω		24K730391	19-1001	TV-189	4604	1.3 Microhenries
L24	3rd Video IF	.1Ω	.1Ω	24B736268	17-4523	TV-130	6219	Core Part No. 76A735943
L25	Fil. Choke	0ΩΩ		24K730391	19-1001	TV-189	4604	1.3Microhenries
L26	RF Coil	0Ω		24A732652				
L27	Series Peaking Coil	1.6Ω		24K737733	19-1005		4612	10 Microhenries
L28	Series Peaking Coil	4.6Ω		24K736961	19-3125 ■		6153 ■	115 Microhenries, Wound on 6.8KΩ resistor
L29	Shunt Peaking Coil	10.5Ω		24K736963	19-4400		6136	440 Microhenries
L30	4.5MC Trap	4.6Ω		24K737615	20-1004	TV-151	1469	Core Part No. 76B733245
L31	Series Peaking Coil	7Ω		24K736012	19-3250 ▲	TV-185	6181 ▲	246 Microhenries; Wound on 10KΩ resistor
L32	Series Peaking Coil	6Ω		24C736006	19-3180	TV-184	6180	175 Microhenries
L33	Shunt Peaking Coil	10.5Ω		24K736963	19-4400		6136	440 Microhenries
L34	Shunt Peaking Coil	16Ω		24K736496	19-4950 ♦		6157 ♦	945 Microhenries, Wound on 1.8KΩ resistor
L35	1st Sound IF	2.3Ω		24B737734				Core Part No. 76B733245
L36	2nd Sound IF	3.3Ω		24B733873	20-1005 †	TV-151 †	1470	Core Part No. 76B733245
L37	Ratio Det.	7Ω	1.5ΩCT	24B736673	17-3497	TV-115	6205	Tertiary Winding=.8Ω Core Part No. 76A735943
L38	RF Choke	1.8Ω		24A733225	19-1005		4612	
L39	RF Choke	1.8Ω		24A733225	19-1005		4612	
L40	RF Coil	8Ω		24B735522	19-3300		6132	336 Microhenries
L41	Linearity Coil	22Ω		24A731609				Wound on .068MMF Cap.

■ Parallel with 6.8KΩ resistor.
▲ Parallel with 10KΩ resistor.
♦ Parallel with 1.8KΩ resistor.
† Remove cap. across coil.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L42	40Ω		1V73757	19-1576	TV-163	6210			HS-5	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L43	.270A	58Ω	2HY	25B737467-B	C5037 ①	C2996 ①	C2326 ①	26C44	C-17X

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA MOTOROLA PART No. FUSE	MOTOROLA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG S/B	3/10A 125V	65A737635	31A737466	313.300 (3AG-S/B 3/10A)	357001	MDL 3/10	4405
M2	1" Piece #26 Copper-wire							

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M3		48K733204 *	1N60	Video Det. (Pigtail)

* Alternate Part No. 48K722720.

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Dial Light	65X10867	#44
M5	Tuner	1U737523	VHF-VTT-79; Chassis TS-533
	Tuner	1U737526	VHF-VTT-80; Chassis TS-533
M6	Tuner	QTT-37	UHF-Chassis TS-533Y
M7	Video Det. Assy.	24K737340	Includes M2, Coils, & Capacitors
M8	Switch		Local-distance (DPDT-Slide Type)
M9	Switch	40B736126	On-Off (Power) Pushbutton Type
M10	Centering Device	48A721145	Includes deflection yoke (T5) Rear Cover
M11	Ion Trap	59K734028	
A4	Trimmer Cap.	20A736287	Video IF Input Trimmer (20-140MMF)
	Button	38K736298	Push, Rear-on-off
	Button	38K736297	Push, Front-on-off
	Safety Glass	61K736132	Models 21C4, 21C4B, Y21C4, Y21C4B, 21K41, 21K41B, Y21K41, Y21K41B, 21K42, 21K42B, Y21K42, Y21K42B, 21K43, 21K43B, Y21K43, Y21K43B, 21K44B, 21K44W, Y21K44B, Y21K44W, 21K45, Y21K45
	Safety Glass	61K736133	Models 24K10, 24K10B, Y24K10, Y24K10B, 24K11, 24K11B, Y24K11, Y24K11B, 24T4, 24T4B, Y24T4, Y24T4B

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	6BC8	6BC8	6BZ7 may be used as a alternate.
V2	Osc.-Mixer	6U8	6U8	
V3	1st Video IF Amp.	6BZ6	6BZ6	
V4	2nd Video IF Amp.	6BZ6	6BZ6	
V5	3rd Video IF Amp.	6CB6	6CB6	
V6	Video Output	1B3GT	1B3GT	
V7	AGC Keying	6AU6	6AU6	
V8	1st Sound IF Amp.	6AU6	6AU6	
V9	2nd Sound IF Amp.	6AU6	6AU6	
V10	Ratio Det.	6AL5	6AL5	
V11	AF Amp.-Horiz. AFC	6SN7GT	6SN7GT	
V12	Audio Output	6W6GT	6W6GT	
V13	Sync Sep.-Sync Phase Inv.	6SN7GTB	6SN7GTB	
V14	Vert. Osc.-Vert. Output	6SL7GT	6SL7GT	
V15	Horiz. Mult.	6SN7GTB	6SN7GTB	
V16	Horiz. Output	6CD6G	6CD6G	
V17	Damper	6AU4GT	6AU4GT	
V18	HV Rect.	1B3GT	1B3GT	
V19	LV Rect.	5U4GB	5U4GB	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MOTOROLA PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	NOTES
V30	21ALP4A ①	21ALP4A ①	21ALP4A ①	21ALP4A ② ① Aluminized 21ALP4B ② ② Silver Screen "85" 21ALP4A/B ③	
	21ALP4	21ALP4		21ALP4	
	24DP4A ①				

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	± 40	400	23HR37469				TM-3033	D-415	TVL-3770
B	± 20	200			FZ10408	FP343	WS342	D-100	R2057
C	± 80	200					TM-50-250		
C2A	± 20	200	23D737470		XB010	FP218.1		D-100	
B	± 5	200			BR425			MT-4504	
C3A	± 30	200	23D73466	AF82-S2	B041	FP589	TM-30-250	E-218	TVL-2663
B	±10	50					TD-10-50	MT-0210	
C4	5	50	23A690543	PR5150V4	BBR4-50	TC30	TD-4-50	MMT-0505	TVA-1303
C5	10	500	23K731537 (Note 1)	PR5500V10	BR1250	TC63	TD-10-500	S-315	TVA-1902
C6	10	500	23K731537 (Note 1)	PR5500V10	BR1250	TC62	TD-10-500	S-315	TVA-1902

Note 1. When C5 is 30MFD (Part No. 23K737706), C6 is not used.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No	SPRAGUE PART No.	NOTES
C7	22		21R120539							
C8	22		21R120539							
C9	470		21R140121	BPD-00047	DD-471	K060	811-471		5GA-T47	
C10	250		21R140115	BPD-00023	DD-221	G051	811-221	UC-5332	5GA-T23	
C11	10000		21R483736	BPD-101	DD-103	K071	801-101	DC-5315	5HK-D15	
C12	1000		21R115366	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C13	2.2		21R115948	NPO-SR2.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C14	10		21R121114	M750-D10	TCN-10	N018	M750K-100	NT-541	5TCU-Q1	
C15	150		21R140112	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C16	5-3		23K735985		839-3		31E1-01-0R5	CT565A		
C17	.68		21A735623							
C18	.75		21K735623					ZT-5675		
C19	2.2		21R115948	NPO-SR2.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C20	150		21R140112	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C21	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C22	22		21R120539							Note 2
C23	22		21R120539							
C24	5-3		23K735985		839-3		31E1-01-0R5	CT565A		
C25	1		21R114071	NPO-S1	TCZ-1	TZ03	NPOA-010		5TCCB-V1	
C26	2.2		21R115948	NPO-SR2.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C27	5-3		23K735985		839-3		31E1-01-0R5	CT565A		
C28	13		21R12110							
C29	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C30A	600		21R400943	BPD-22001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	600									
C31	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C32	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	Note 3
C33A	1500		21R400943	BPD-22001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	Note 3
B	1500									Note 2
C34	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C35	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C36	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C37	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C38	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C39	75		21K735623					ZT-5675		
C40	22		21R120539							
C41	1000		21R122549	EF-001	MPT-1000				503C-D1	
C42	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C43	1000		21R115366	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C44	560		21R130938	BPD-00056	DD-561	G083	811-561	UC-5356	5GA-T56	
C45	470		21R140121	BPD-00047	DD-471	K060	831-471	MCB545	5GA-T47	
C46	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C47	470		21R114554	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C48	1000		21R115366	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C49A	600		21R400943	BPD-22001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	600									
C51	22		21R120539							
C52	22		21R120539							
C53	.1	200	21R21573	P286N-1	DF-104	CUB2P1		PT401	2TM-P1	
C54	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C55	68		21R400930							
C56	27		21R119696							
C57	.1	300	23R21573	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C58	10000		21R122789	BPD-01	DD-103	K082	811-01	DC-511	5HK-01	
C59	3000	3000	21R130093		VD36				30ME-D5	
C60	05	400	23R21567	P488N-05	DF-503	CUB4S8		PT415	4TM-S5	
C61	.01	1000		P108EN-01	DD-103	CUB1S1		PT1H1	10TM-S1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No	SPRAGUE PART No.	NOTES
C62	470		21R131797	BPD -00047	DD-471	K060	811-471	MCB245	5GA-T47	
C63	.25	100	21K132045	P288N-25		CUB2P25		PT4035	2TM-P25	
C64	.25	100	23K132045	P288N-25		CUB2P25		PT4035	2TM-P25	
C65	2.2		21R115948	NPO-SR2.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C66	18		21R120578							
C67	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C68	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C69	1500		21R120100	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C70	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C71	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C72	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C73	470		21R121797	BPD-00047	DD-471	K060	811-471	MCB245	5GA-T47	
C74	1000		21R115366	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C75	3300		21R120422	S1330	D6-532	K077	811-0033	UC-5333	5HK-D33	
C77	.18	400	21R21774	P488N-15		CUB4P15		PT4015	4TM-P15	
C78	470		21R121797	BPD-00047	DD-471	K060	811-471	MCB245	5GA-T47	
C79	.04	400	21K780184	P488N-04	DF-403	CUB4S4		PT414	4TM-S4	
C80	.005	1000	21R21777	HVD-15-4700	DD-502	CUB1SD5	1R5KV-472	PT1S25	10TM-D5	
C81	10000	1000	21R122789	P108EN-01	DD-103	CUB1S81		PT1S81	10HK-S1	
C82	4700		21R120549	BPD-0047	DD-472	K079	811-0047	DC-523	5HK-D47	
C83	220		21R122420	BPD-00022	DD-221	G051	811-221	MCB240	5GA-T22	
C84	.05	400	21R21567	BPD-05	DF-503	CUB4S8		PT415	4TM-S5	
C85	.0047	400	21K74634	S1470	D6-472	CUBSD47	GP2-333-472	PT6247	6TM-D47	
C86	.0047	400	23K74634	S1470	D6-472	CUBSD47	GP3-333-472	PT6247	6TM-D47	
C87	.047	400	23K74633	S1473	D6-473	CUB4S3	GP3-333-473	PT643	6TM-S3	
C88	4700		21R120149	BPD-0047	DD-472	K079	811-0047	DC-523	5HK-D47	
C89	.05	400	23R21567	BPD-05	DF-503	CUB4S8		PT415	4TM-S5	
C90	.05	600	21R21567	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C91	470		21R410151	BPD-00047	DD-471	K060	811-471	MCB245	5GA-T47	
C92	1000		21R410127	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C93	3300		21R120422	S1330	D6-532	K077	811-0033	UC-5333	5HK-D33	
C94	.001	1000	21R12104	HVD-15-1000	DD-102	CUB1SD1	1R5 KV-102	PT1S21	10TM-D1	
C95	3300		21R120422	S1330	D6-332	K077	811-0033	UC-5333	5HK-D33	
C96	10000		21R21948	BPD-01	DD-103	K082	811-01	DC-511	5HK-01	
C97	.0047	400	23K74634	S1470	D6-472	CUBSD47	GP2-333-472	PT6247	6TM-D47	
C98	100		21R400837	S100	D6-101	TP34	801-101	MCB243	5GA-T1	
C99	390		21R735757	1469-00039	D6-391	6S5T39	811-391	MCB243	M5-339	
C100	390		21R735757	1469-00039	D6-391	6S5T39	811-391	MCB243	M5-339	
C101	5000		21R115312	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C102	470	2000	21R121478	DD30-471		V27A7	3KV-471	DC30347	30GA-T47	
C103	100	3000	21R121626	DD30-101		V27T1	3KV-101	DC3031	30GA-T1	
C104	100	2000	21R122526	DD30-101		V27T1	3KV-101	DC3031	30GA-T1	
C105	82	2000	21R120150	DD30-820					20GA-Q82	
C106	470		21R121797	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	Note 4

Note 2. Used in Tuner VTT89 only.
Note 3. Used in Tuner VTT79 only.
Note 4. Not used in some versions.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	350Ω		18B736227	F1-0	RTV-550	QJ-876 † †	UF52L	Contrast (Panel)
B	1Meg	½		R2-62			UB1E-735	Volume Tap at 200KΩ (Rear)
R2A	1Meg	½	18K736148	AB-70	A47-1Meg-Z	Q13-137	TA18A	Tone
B	Shaft		Not Req.	AK-4	K50-3	Not Req.	Not Req.	Attach to R3A.
R3A	5Meg	½	18K733415	AB-87	A47-5Meg-S	Q11-136 •	TA25L	Brightness-See Note 1
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R3A.
R4A	250KΩ	½	18K733417	AB-S9 •	A47-500K§•	Q11-133 •	TA95L •	Vertical Hold-Stop at 350KΩ-See Note 2.
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R4A.
R5A	100KΩ	½	18K735220	AB-40	A47-100K-S	Q11-128	TA19SL	Horiz. Hold-See Note 3.
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R5A.
R6A	750Ω	½	18K733416	AB-5	A47-750-S	Q11-105	TA27SL	Vertical Linearity
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R6A.
R7A	6Meg	½	18B733413	AB-S7 †	A47-5Meg-S †	Q11-141 †	SU-57 †	Vert. Size-Stop at 1Meg
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R7A.

Note 1. Part No. 18K737545 used in some versions.
Note 2. Part No. 18K737546 used in some versions.
Note 3. Part No. 18K737547 used in some versions.
† Connect a 1Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
• Connect a 330KΩ resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
* Universal Replacement (Mallory Exact Duplicate Part No. UE45L).
††Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-103, P10-110 (Panel)
B13-137X, R21-201 (Rear)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R8	680Ω	½		BTS-680	
R9	680Ω	½		BTS-680	
R10	680Ω	½		BTS-680	
R11	330Ω	½		BTS-330	
R12	1Meg	½	6R6004	BTS-1Meg	
R13	220KΩ	½	6R6018	BTS-232K	
R14	47KΩ	½	6R6056	BTS-47K	
R15	10KΩ	½	6R6054	BTS-10K	
R16	100KΩ	½	6R6301	BTS-100K	
R17	4700Ω	½	6R6059	BTS-4700	
R18	10KΩ	½	6R6054	BTS-10K	
R19	15KΩ	½	6R3119		
R20	15KΩ	½	6R3119		
R21	3000Ω	½	6R6301	BTS-1000	
R22	4700Ω	½	6R6039	BTS-4700	
R23	8800Ω	½	6R400839	BTS-8800	
R24	18KΩ	½	6R6281	BTS-18K	
R25	1000Ω	½	6R6301	BTS-1000	
R26	2200Ω	½	6R6018	BTS-2202K	
R27	1500Ω	½	6R5700	BTA-1500	
R28	1000Ω	½	6R6301	BTS-1000	
R29	8300Ω	3	6R130579	BTS-8300	Note 1
R30	47Ω	½	6R5560	BTS-47	
R31	18KΩ	½	6R5581		
R32	1000Ω	½	6R6301	BTS-1000	
R33	82000Ω	2	6K130579		Note 1
R34	470Ω	½		BTS-47	Note 2
R35	330KΩ	½	6R3098		

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R36	1200Ω	½	6R6393		
R37	8200Ω	2	6K130579		
R38	1000Ω	½	6R6301	BTS-1000	
R39	390KΩ	½	6R5588		
R40	1MΩ	½	6R5561	BTS-1M	
R41	1900Ω	½	6R5659	BTS-1900	
R42	3300Ω	½	6R6036	BTS-3300	
R43	5000Ω	5	17K734189	PW7-5000	
R44	12KΩ	2	6R21448	BTS-12K	
R45	10KΩ	2	6R6299	BTS-12K	
R46	33KΩ	½	6R6402	BTS-33K	
R47	470Ω	½	6R5563	BTA-470	
R48	1MΩ	½	6R2031	BTS-1M	
R49	100KΩ	½	6R6301	BTS-100K	
R50	680KΩ	½	6R6475	BTS-680K	
R51	470KΩ	½	6R6377	BTS-470K	
R52	2.2Meg	½	6R5567	BTS-2.2Meg	
R53	68KΩ	½	6R6074	BTS-10K	
R54	10KΩ	½	6R6054	BTS-10K	
R55	180KΩ	½	6R6444	BTS-180K	
R56	1Meg	1	6R6787	BTA-1Meg	
R57	1.2Meg 5%	½	6R123203	BTA-1.2Meg 5%	
R58	8.2Meg 5%	½	6R11414	BTS-8.2Meg 5%	
R59	33KΩ	½	6R6410	BTS-33K	
R60	10KΩ	½	6R6420	BTA-10K	
R61	150Ω	½	6R6373	BTS-150	

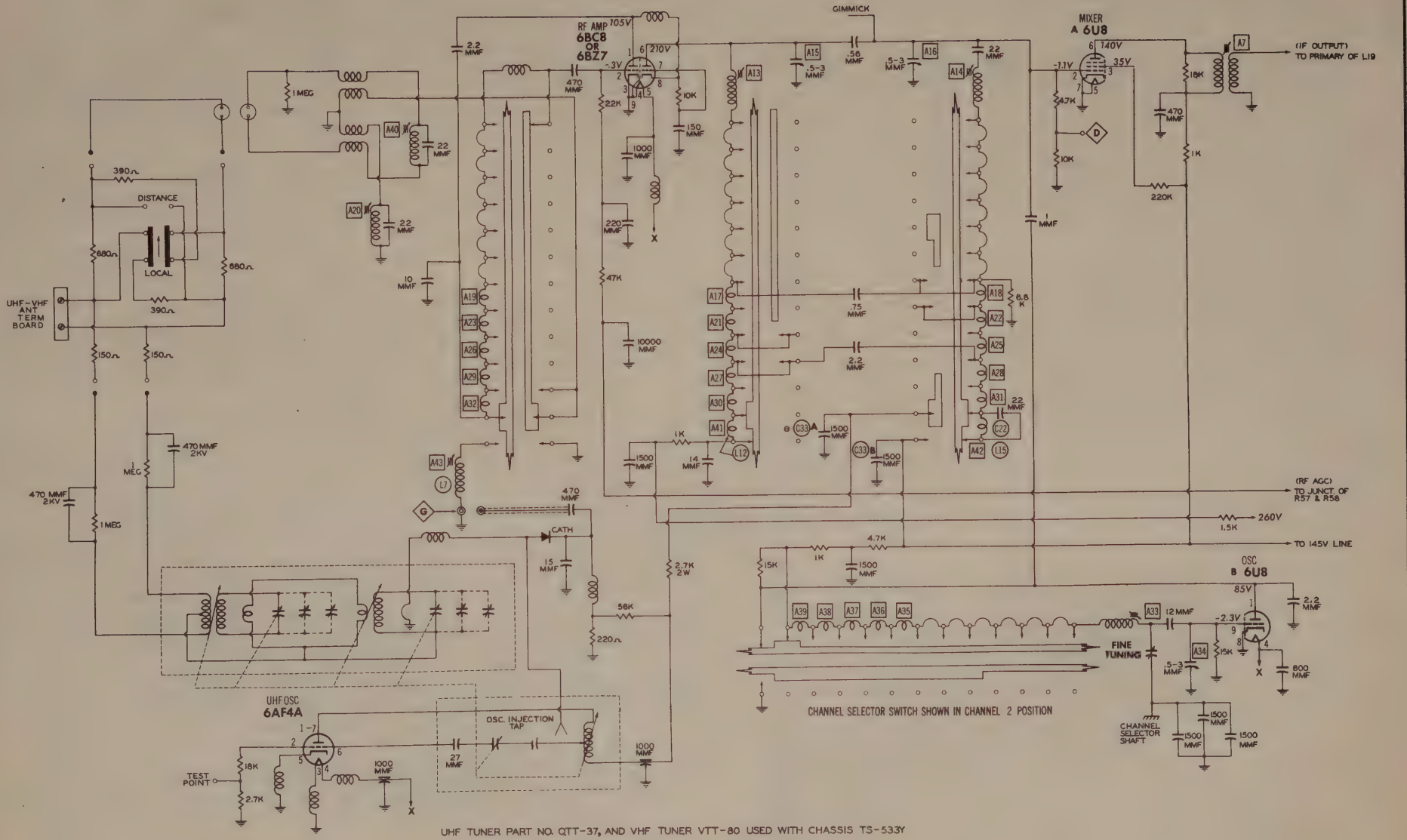
ITEM No.	RATING	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
	OHMS WATT			
R62	15KΩ ½	6R6477	BTS-15K	
R63	10KΩ ½	6R6420	BTA-10K	
R64	150Ω ½	6R6373	BTS-150	
R65	220Ω ½	6R6270	BTS-220	
R66	33KΩ ½	6R6402	BTS-33K	
R67	680KΩ ½	6R6428	BTS-680K	
R68	680KΩ ½	6R6428	BTS-680K	
R69	68KΩ ½	6R6001	BTS-68K	
R70	33KΩ 5% ½	6R5758	BTA-33K 5%	
R71	12000 5% ½	6R6186	BTS-12OO 5%	
R72	15KΩ ½	6R5393	BTS-10K	
R73	1.5Meg ½	6R3965	BTS-1.5Meg	
R74	270KΩ ½	6R6641	BTS-270K	
R75	1Meg ½	6R6046	BTS-1Meg	
R76	560KΩ ½	6R5697	BTS-560K	
R77	22KΩ ½	6R6397	BTS-22K	
R78	680KΩ ½	6R6428	BTS-680K	
R79	2700Ω ½	6R5577	BTS-2700	
R80	2200Ω ½	6R6052	BTS-2200	
R81	22KΩ ½	6R6028	BTS-22K	
R82	10KΩ ½	6R6054	BTS-10K	
R83	5600Ω ½	6R6017	BTS-5600	
R84	5600Ω 2	6K122012	BTS-5600	Note 1
R85	68KΩ ½	6R6074	BTS-68K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R86	100Ω ½	6R6018	BTS-100		
R87	580Ω ½	6R6291			
R88	580Ω ½	6R6291			
R89	100KΩ ½	6R6031			
R90	100KΩ ½	6R6031			
R91	130KΩ ½	6K123578			
R92	22KΩ ½	6R6397	BTS-22K		
R93	100KΩ ½	6R6031			
R94	47Ω ½	17K468266	BW½-47		
R95	4.7Meg ½	6R2122			
R96	580KΩ ½	6R6317	BTS-5800		
R97	82KΩ ½	6R5644			
R98	68KΩ ½	6R6074	BTS-68K		
R99	680KΩ ½	6R6428			
R100	100Ω ½	6R6229			
R101	4700Ω ½	6R6060	BTS-4700		
R102	470Ω ½	6R5949	BTS-470		
R103	1Meg ½	6R6046			
R104	100Ω ½	6R6227			
R105	180Ω ½	6R2031			
R106	6800Ω ½	6R490492	BTA-6800		
R107	6.8Ω ½	6K12502			
R108	470KΩ ½	6R6032	BTS-470K		
R109	3.3Ω ½	17K485412	BW½-3.3		

Note 1. Use with a heat dissipating hand. If bands are not used the wattage rating must be doubled.
Note 2. Some versions use a 1MΩ 1W resistor in this application (Mfgr. Part #6R2031).
Note 3. Not used in some versions.

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R110	1000Ω	½	6R6301	BTS-1000	
R111	1000Ω	½	6R6301	BTS-1000	
R112	1000Ω	½	6R6301	BTS-1000	
R113	1000Ω	½	6R6301	BTS-1000	
R114	1000Ω	½	6R6301	BTS-1000	
R115	1000Ω	½	6R6301	BTS-1000	
R116	1000Ω	½	6R6301	BTS-1000	
R117	1000Ω	½	6R6301	BTS-1000	
R118	1000Ω	½	6R6301	BTS-1000	
R119	1000Ω	½	6R6301	BTS-1000	
R120	1000Ω	½	6R6301	BTS-1000	
R121	1000Ω	½	6R6301	BTS-1000	
R122	1000Ω	½	6R6301	BTS-1000	
R123	1000Ω	½	6R6301	BTS-1000	
R124	1000Ω	½	6R6301	BTS-1000	
R125	1000Ω	½	6R6301	BTS-1000	
R126	1000Ω	½	6R6301	BTS-1000	
R127	1000Ω	½	6R6301	BTS-1000	
R128	1000Ω	½	6R6301	BTS-1000	
R129	1000Ω	½	6R6301	BTS-1000	
R130	1000Ω	½	6R6301	BTS-1000	
R131	1000Ω	½	6R6301	BTS-1000	
R132	1000Ω	½	6R6301	BTS-1000	
R133	1000Ω	½	6R6301	BTS-1000	
R134	1000Ω	½	6R6301	BTS-1000	
R135	1000Ω	½	6R6301	BTS-1000	
R136	1000Ω	½	6R6301	BTS-1000	
R137	1000Ω	½	6R6301	BTS-1000	
R138	1000Ω	½	6R6301	BTS-1000	
R139	1000Ω	½	6R6301	BTS-1000	
R140	1000Ω	½	6R6301	BTS-1000	
R141	1000Ω	½	6R6301	BTS-1000	
R142	1000Ω	½	6R6301	BTS-1000	
R143	1000Ω	½	6R6301	BTS-1000	
R144	1000Ω	½	6R6301	BTS-1000	
R145	1000Ω	½	6R6301	BTS-1000	
R146	1000Ω	½	6R6301	BTS-1000	
R147	1000Ω	½	6R6301	BTS-1000	
R148	1000Ω	½	6R6301	BTS-1000	
R149	1000Ω	½	6R6301	BTS-1000	
R150	1000Ω	½	6R6301	BTS-1000	
R151	1000Ω	½	6R6301	BTS-1000	
R152	1000Ω	½	6R6301	BTS-1000	
R153	1000Ω	½	6R6301	BTS-1000	
R154	1000Ω	½	6R6301	BTS-1000	
R155	1000Ω	½	6R6301	BTS-1000	
R156	1000Ω	½	6R6301	BTS-1000	
R157	1000Ω	½	6R6301	BTS-1000	
R158	1000Ω	½	6R6301	BTS-1000	
R159	1000Ω	½	6R6301	BTS-1000	
R160	1000Ω	½	6R6301	BTS-1000	
R161	1000Ω	½	6R6301	BTS-1000	
R162	1000Ω	½	6R6301	BTS-1000	
R163	1000Ω	½	6R6301	BTS-1000	
R164	1000Ω	½	6R6301	BTS-1000	
R165	1000Ω	½	6R6301	BTS-1000	
R166	1000Ω	½	6R6301	BTS-1000	
R167	1000Ω	½	6R6301	BTS-1000	
R168	1000Ω	½	6R6301	BTS-1000	
R169	1000Ω	½	6R6301	BTS-1000	
R170	1000Ω	½	6R6301	BTS-1000	
R171	1000Ω	½	6R6301	BTS-1000	
R172	1000Ω	½	6R6301	BTS-1000	
R173	1000Ω	½	6R6301	BTS-1000	
R174	1000Ω	½	6R6301	BTS-1000	
R175	1000Ω	½	6R6301	BTS-1000	
R176	1000Ω	½	6R6301	BTS-1000	
R177	1000Ω	½	6R6301	BTS-1000	
R178	1000Ω	½	6R6301	BTS-1000	
R179	1000Ω	½	6R6301	BTS-1000	
R180	1000Ω	½	6R6301	BTS-1000	
R181	1000Ω	½	6R6301	BTS-1000	
R182	1000Ω	½	6R6301	BTS-1000	
R183	1000Ω	½	6R6301	BTS-1000	
R184	1000Ω	½	6R6301	BTS-1000	
R185	1000Ω	½	6R6301	BTS-1000	
R186	1000Ω	½	6R6301	BTS-1000	
R187	1000Ω	½	6R6301	BTS-1000	
R188	1000Ω	½	6R6301	BTS-1000	
R189	1000Ω	½	6R6301	BTS-1000	
R190	1000Ω	½	6R6301	BTS-1000	
R191	1000Ω	½	6R6301	BTS-1000	
R192	1000Ω	½	6R6301	BTS-1000	
R193	1000Ω	½	6R6301	BTS-1000	
R194	1000Ω	½	6R6301	BTS-1000	
R195	1000Ω	½	6R6301	BTS-1000	
R196	1000Ω	½	6R6301	BTS-1000	
R197	1000Ω	½	6R6301	BTS-1000	
R198	1000Ω	½	6R6301	BTS-1000	
R199	1000Ω	½	6R6301	BTS-1000	
R200	1000Ω	½	6R6301	BTS-1000	
R201	1000Ω	½	6R6301	BTS-1000	
R202	1000Ω	½	6R6301	BTS-1000	
R203	1000Ω	½	6R6301	BTS-1000	
R204	1000Ω	½	6R6301	BTS-1000	
R205	1000Ω	½	6R6301	BTS-1000	
R206	1000Ω	½	6R6301	BTS-1000	
R207	1000Ω	½	6R6301	BTS-1000	
R208	1000Ω	½	6R6301	BTS-1000	
R209	1000Ω	½	6R6301	BTS-1000	
R210	1000Ω	½	6R6301	BTS-1000	
R211	1000Ω	½	6R6301	BTS-1000	
R212	1000Ω	½	6R6301	BTS-1000	
R213	1000Ω	½	6R6301	BTS-1000	
R214	1000Ω	½	6R6301	BTS-1000	
R215	1000Ω	½	6R6301	BTS-1000	
R216	1000Ω	½	6R6301	BTS-1000	
R217	1000Ω	½	6R6301	BTS-1000	
R218	1000Ω	½	6R6301	BTS-1000	
R219	1000Ω



UHF TUNER PART NO. QTT-37, AND VHF TUNER VTT-80 USED WITH CHASSIS TS-533Y

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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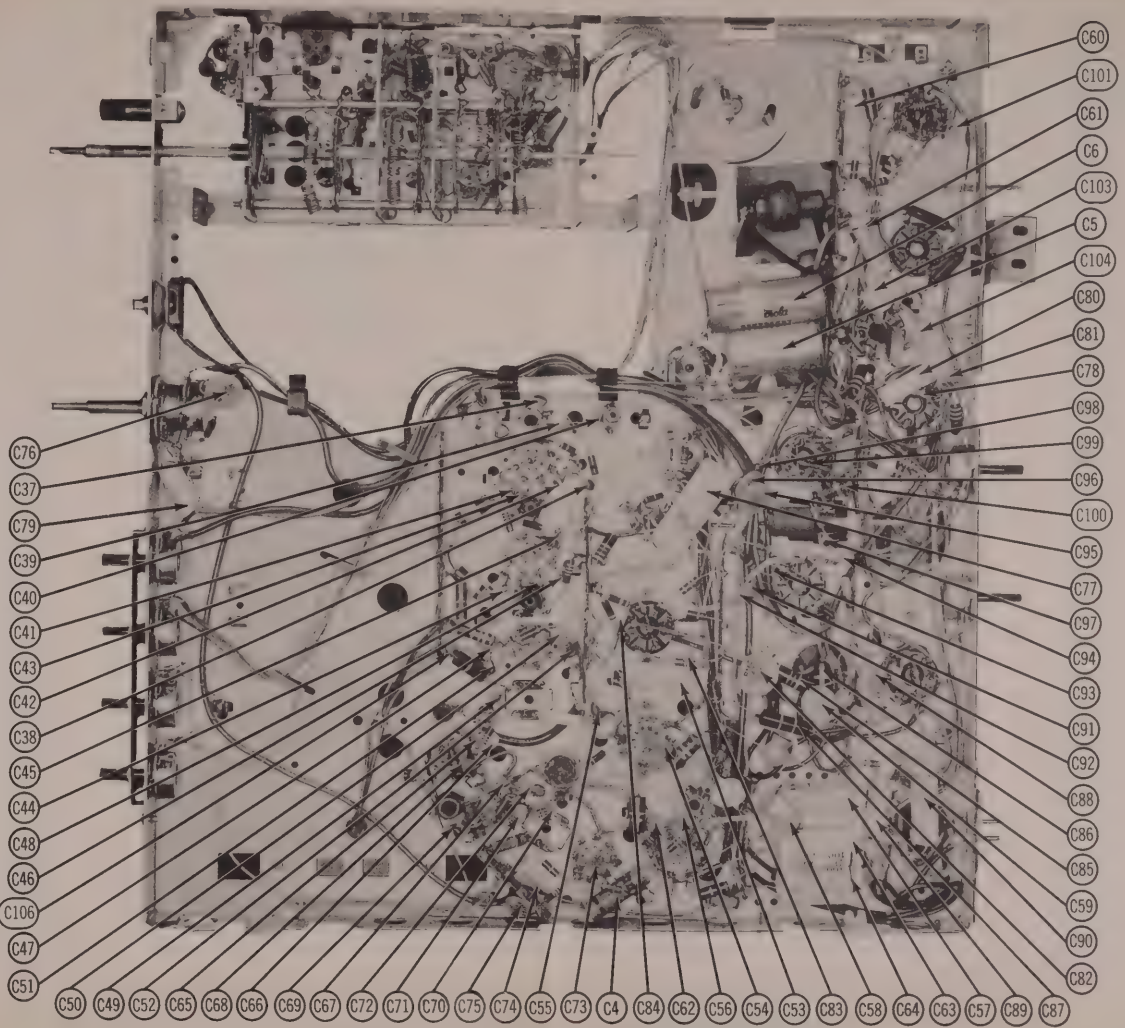
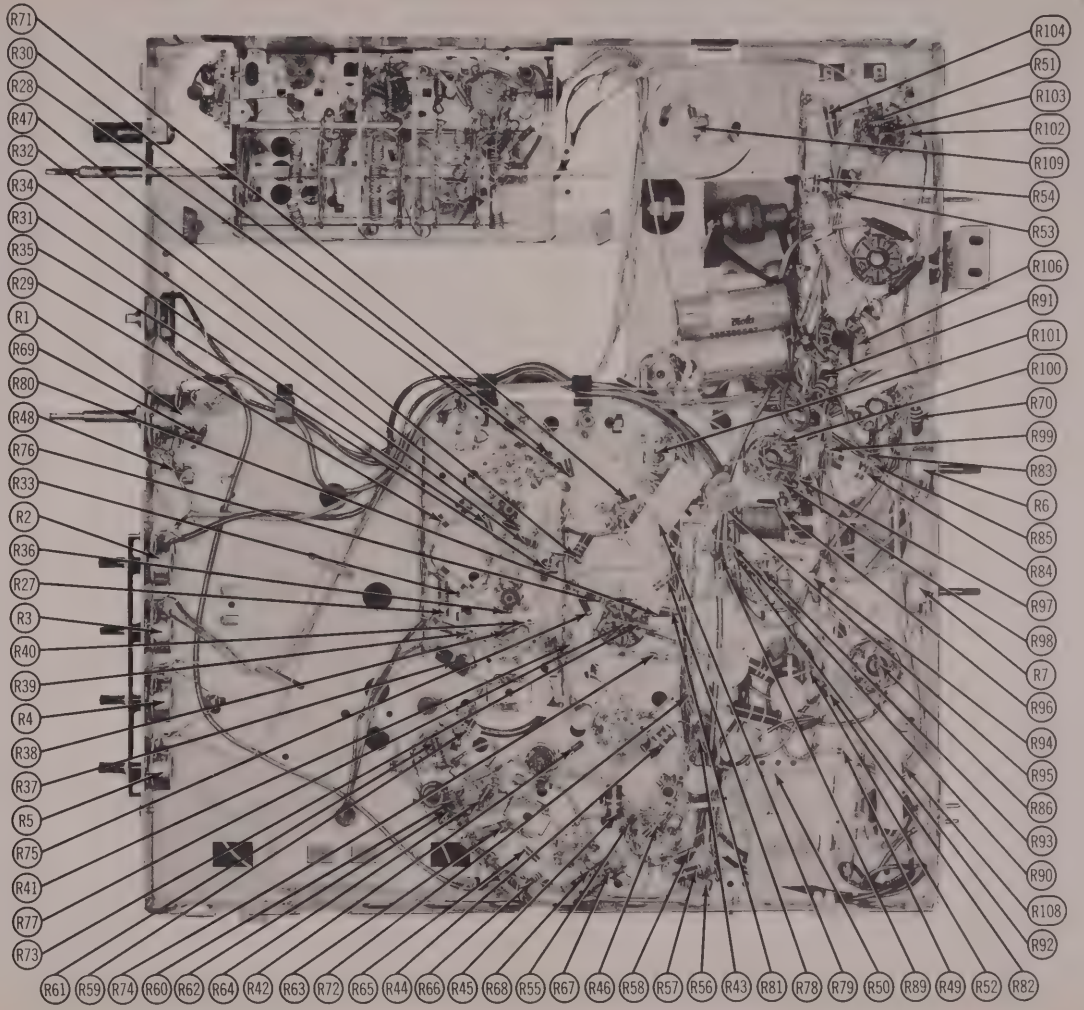
ALTERNATE VHF-UHF TUNER SCHEMATIC

MOTOROLA MODELS V21C4, B, V21K41, B, V21K42, B, V21K43, B, V21K44B, W, V21K45, V24K10, B, V24K11, B, V24T4, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24S14, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24S14, B (Ch. TS-533, Y)



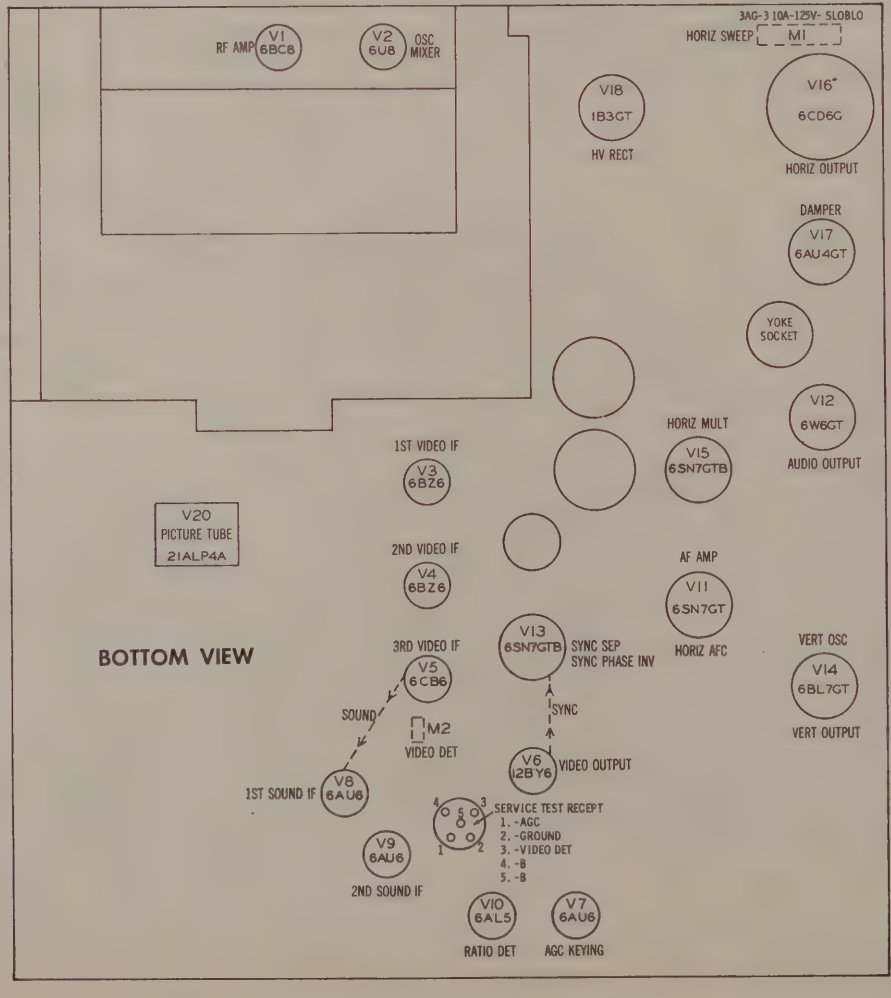
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K43, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24T4, B, 21C4, B, 21K41, B, B, 21K42, B, 21K43, B, 21K44B, W 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC8	INF	2Meg	0Ω	0Ω	.1Ω	† 2.5KΩ	INF	INF	0Ω
V 2	6U8	■ 5.7KΩ	15KΩ	■ 220KΩ	.1Ω	0Ω	■ 1KΩ	0Ω	0Ω	15KΩ
V 3	6BZ6	330KΩ	47Ω	0Ω	.1Ω	† 8.2KΩ	† 8.2KΩ	0Ω		
V 4	6BZ6	330KΩ	47Ω	0Ω	.1Ω	† 8.2KΩ	† 8.2KΩ	0Ω		
V 5	6CB6	1.2KΩ	120Ω	.1Ω	0Ω	† 8.2KΩ	† 39KΩ	0Ω		
V 6	12BY7	26Ω	3.9KΩ	26Ω	0Ω	0Ω	.1Ω	■ 5.5KΩ	■ 500Ω	26Ω
V 7	6AU6	■ 220KΩ	150KΩ	.1Ω	0Ω	1.3Meg	† 58Ω	150KΩ		
V 8	6AU6	2.3Ω	0Ω	.1Ω	0Ω	■ 10KΩ	■ 10KΩ	150Ω		
V 9	6AU6	15KΩ	0Ω	.1Ω	0Ω	■ 10KΩ	■ 10KΩ	150Ω		
V 10	6AL5	INF	INF	.1Ω	0Ω	6.8KΩ	0Ω	6.8KΩ		
V 11	6SN7GT	460KΩ	† 33KΩ	1.2KΩ	300KΩ	22KΩ	100KΩ	.4Ω	.1Ω	
V 12	6W6GT	TP	0Ω	† 265Ω	† 58Ω	† 33KΩ	TP	.1Ω	.50KΩ	
V 13	6SN7GTB	1.8Meg	■ 1Meg	26Ω	22KΩ	■ 9.5KΩ	2.2KΩ	.1Ω	0Ω	
V 14	6BL7GT	▲ 3.5Meg	▲ 900Ω	6.5KΩ	550KΩ	▲ 3.5Meg	50Ω	.1Ω	0Ω	
V 15	6SN7GTB	150KΩ	† 75KΩ	1KΩ	5Meg	† 11KΩ	1KΩ	.1Ω	0Ω	
V 16	6CD6G	TP	.1Ω	0Ω	TP	1Meg	TP	0Ω	■ 1KΩ	TOP CAP ▲ 32Ω
V 17	6AU4GT	NC	TP	300KΩ	NC	† 65Ω	TP	0Ω	.1Ω	
V 18	1B3GT			PINS 1-8 HAVE INF RESISTANCE						TOP CAP ▲ 200Ω
V 19	5U4GB	INF	200KΩ	INF	10Ω	INF	1Ω	INF	200KΩ	
V 20	21ALP4A	0Ω	■ 3Meg	PIN 6 ▲ 18Ω	PIN 10 ▲ 18Ω	PIN 11 ■ 100KΩ	PIN 12 .1Ω			

† MEASURED FROM PIN 2 OF V19.
■ MEASURED FROM 145V LINE.
▲ MEASURED FROM PIN 3 OF V17.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS (cont)

4.5MC TRAP ALIGNMENT

Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any non-interfering	DC probe thru detector (Fig. 6) to pin 11 (cathode) of picture tube. Low side to chassis.	A12	Adjust for MINIMUM deflection on VTVM.

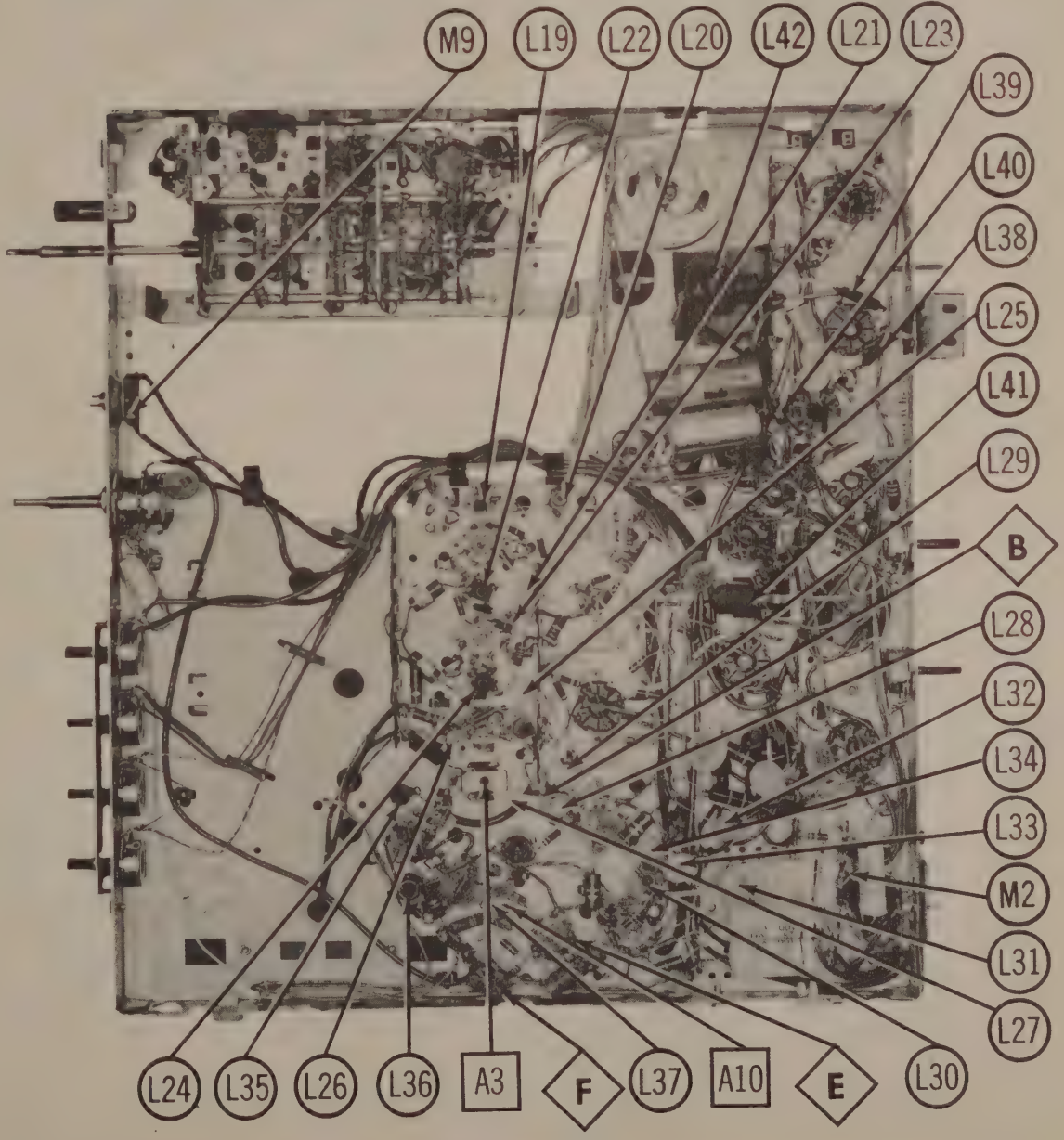
ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a local TV station. Adjust the fine tuning control until a noticeable 4.5MC beat appears in the picture. Adjust A12 for minimum 4.5MC beat in the picture. Adjust A12 so that the core is approximately centered between the two points where the 4.5MC beat appears in the picture.

TUNER ALIGNMENT

The RF and Mixer portion of this receiver have been properly aligned at the factory and are very stable. Alignment of this portion should not be required in the field.

TP1	.1V	IF AGC	TP5	145V	LOW B+ LINE
TP2	140V	SCREEN B+(V3)	TP6	260V	HIGH B+ LINE
TP3	.1V	IF AGC	TP7	225V	HORIZ. OSC. B+(V15)
TP4	-.2V	VIDEO	TP8	-.4V	HORIZ. AFC.



CHASSIS-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To eliminate horizontal interference, remove yoke plug and connect a 2500 ohm 10 watt resistor from pin 4 of V12 to chassis.

VIDEO IF ALIGNMENT

Disable the local oscillator by shorting pin 9 of V2 to chassis with a short lead.
If sweep generator has no built-in marker, loosely couple the output of an accurately calibrated AM generator to the video IF strip.
If the coils have two points of resonance, the correct settings are with the cores away from the center of the coil forms so as not to effect coupling between coil and trap windings.
Connect the negative lead of a 6 volt battery to point Ⓐ.
Positive lead to chassis.
Attenuate sweep generator to maintain 3 to 5 volts peak to peak on scope at point Ⓑ.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to point Ⓒ. Low side to chassis.	44.0MC (10MC Swp.)	42.25MC	13	Vert. Amp. thru 47KΩ point Ⓑ. Low side to chassis.	A1	Adjust to place 42.25MC marker at 55% on response curve as in Fig. 1.
2.	"	"	"	45.75MC	"	"	A2, A3	Adjust A2 to place 45.75MC marker at 65% on high side of response curve. Simultaneously adjust A3 for flattop and symmetrical response similar to Fig. 1.
3.	"	High side to point Ⓓ. Low side to chassis.	"	41.25MC	"	"	A4, A5, A6	Connect lead across R17. Pre-set A7 by turning away from chassis until coils effect is moved out of response curve. Adjust A4 & A5 to place markers (42.25MC and 45.75MC) 30% down as in Fig. 2. Increase generator output to observe 41.25MC trap notch. Adjust A6 to place 41.25MC marker in trap notch as in Fig. 2.
4.	"	"	"	41.25MC 42.25MC 45.75MC	"	"	A7	Adjust response curve similar to Fig. 3 with correct marker positions as shown in Fig. 3. Remove short from across R17.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set contrast control at maximum contrast position.
If a 4.5MC signal of crystal accuracy is not available, a TV station signal may be used.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓔ. Common to chassis.	A8, A9, A10	Adjust for maximum deflection with VTVM set to 5 volt scale. Attenuate generator as necessary.
6.	"	"	"	"	DC probe to point Ⓕ. Common to chassis.	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point Ⓔ. Low side to chassis.	A8, A9, A10	Disconnect stabilizer capacitor (C4). Adjust for curve of maximum amplitude and symmetry as in Fig. 4.
6.	"	"	"	"	"	Vert. Amp. to point Ⓕ. Low side to chassis.	All	Reconnect C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. Retouch A10 for maximum amplitude and straightness of crossover lines.

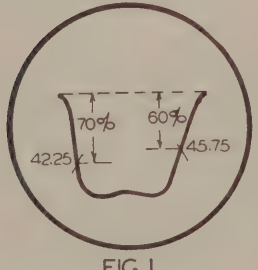


FIG. 1

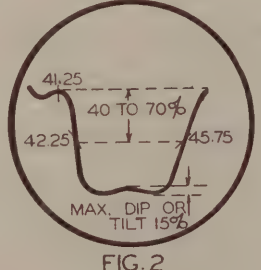


FIG. 2

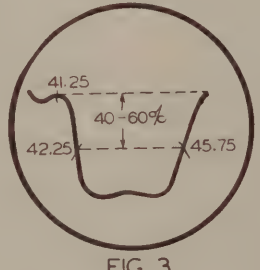


FIG. 3

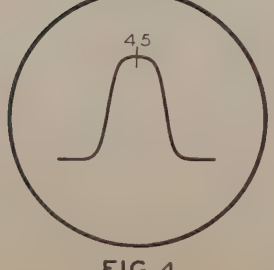


FIG. 4

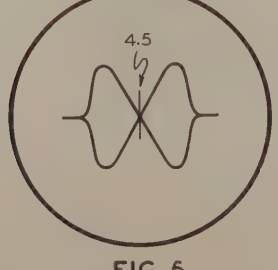


FIG. 5

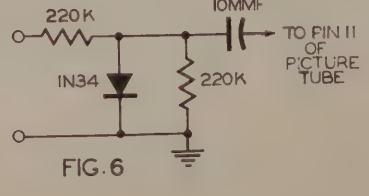
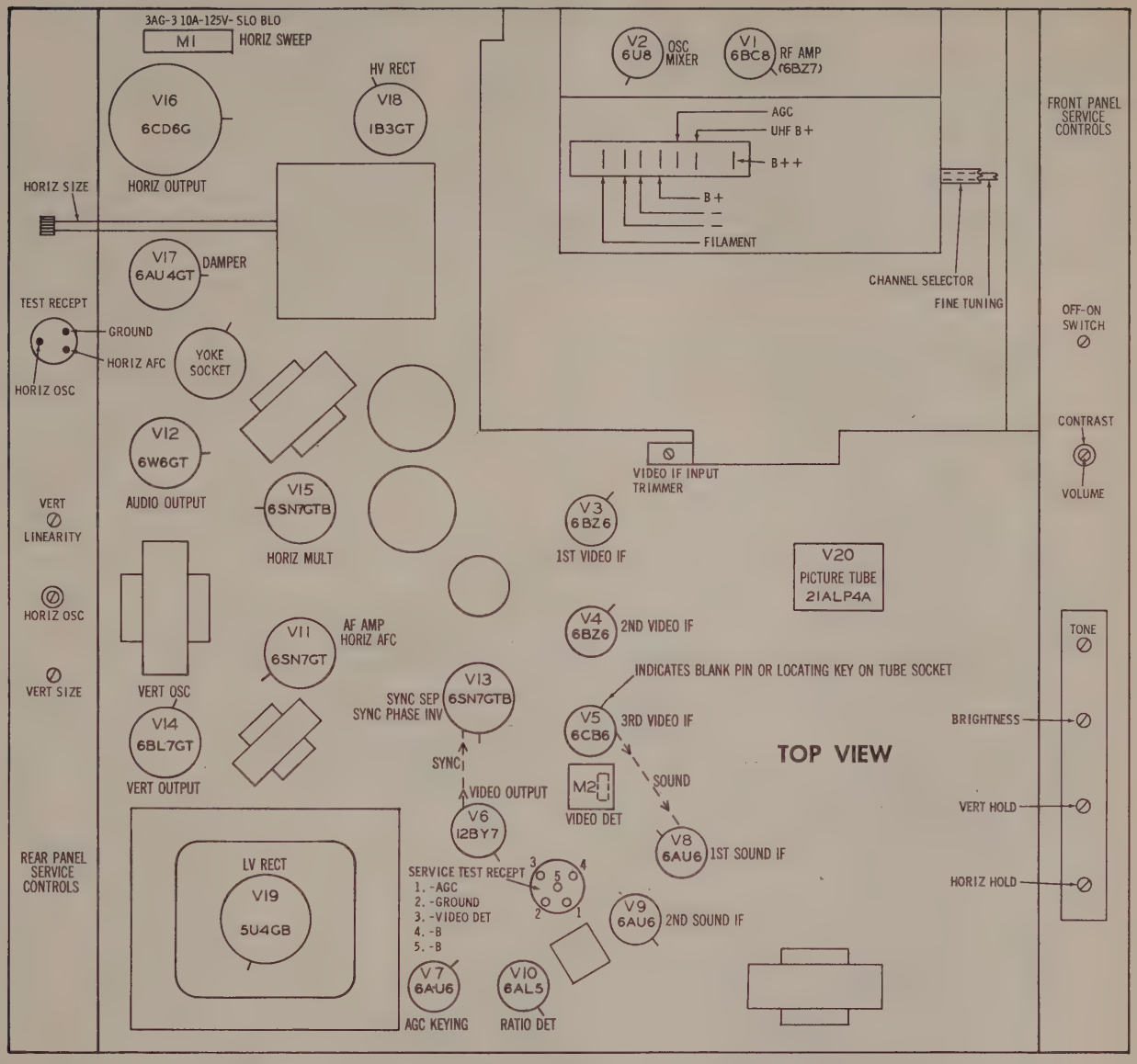


FIG. 6

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

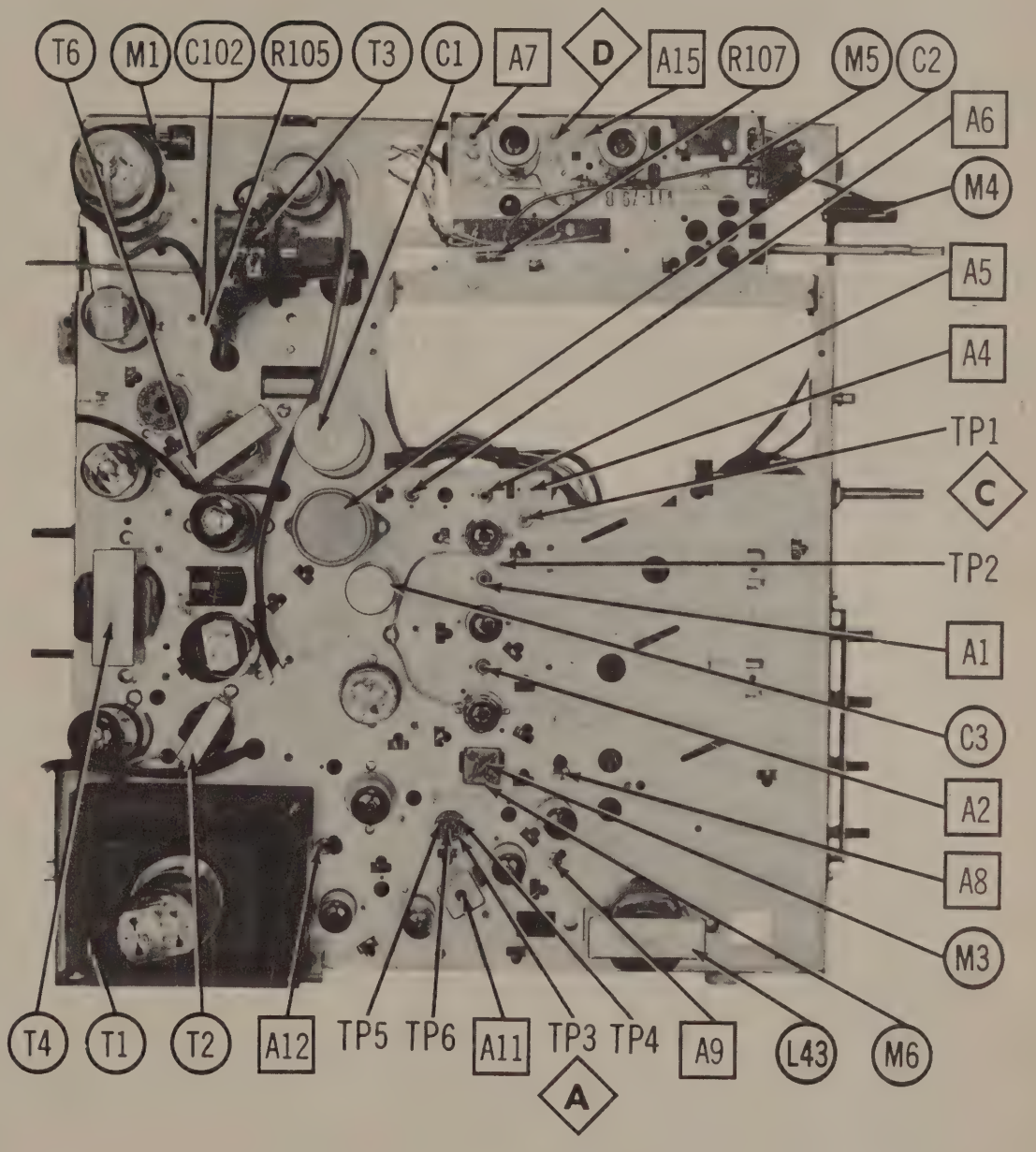
POWER SUPPLY FAILURE
No raster, no sound - V19, Fuse (M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V20
Has pic, no sound - V8, V9, V10, V11
Overloaded picture - V7

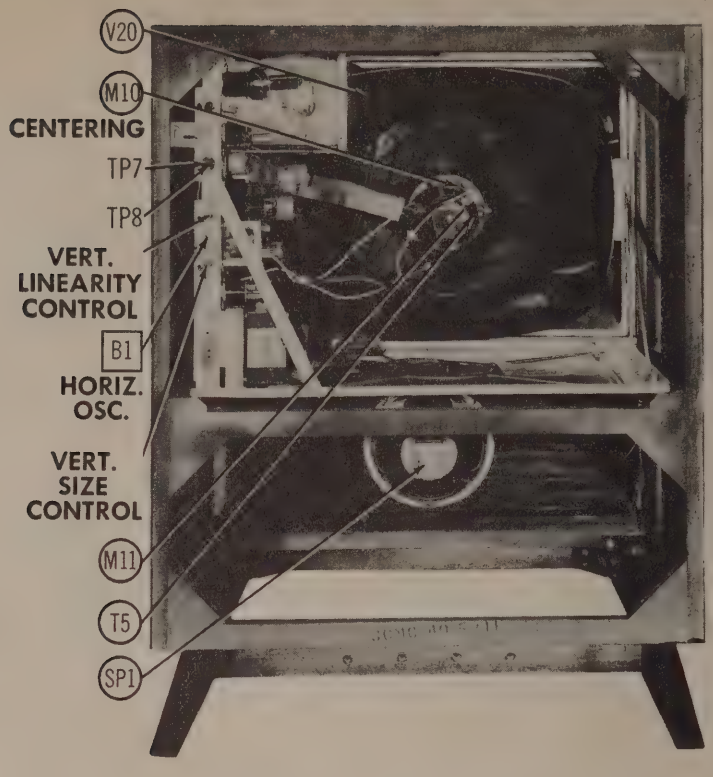
SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V11, V13, V15
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V15, V16, V17, V18, V20, Fuse (M1)
No vertical deflection - V14
Poor vert. linearity or foldover - V14
Poor horiz. linearity or foldover - V15, V16, V17
Narrow picture - V15, V16, V17, V18, V19
Vert. off freq. - V13, V14
Horiz. off freq. - V11, V13, V15

MOTOROLA MODELS Y21C4, B, Y21K41, B, Y21K42, B, Y21K43, B, Y21K44B, W, Y21K45, Y24K10, B, Y24K11, B, Y24T4, B, 21C4, B, 21K41, B, R, 21K42, B, 21K43, B, 21K44B, W, 21K45, 24K10, B, 24K11, B, 24T4, B (Ch. TS-533, Y)



CHASSIS-TOP VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the brightness and contrast controls for a normal picture.

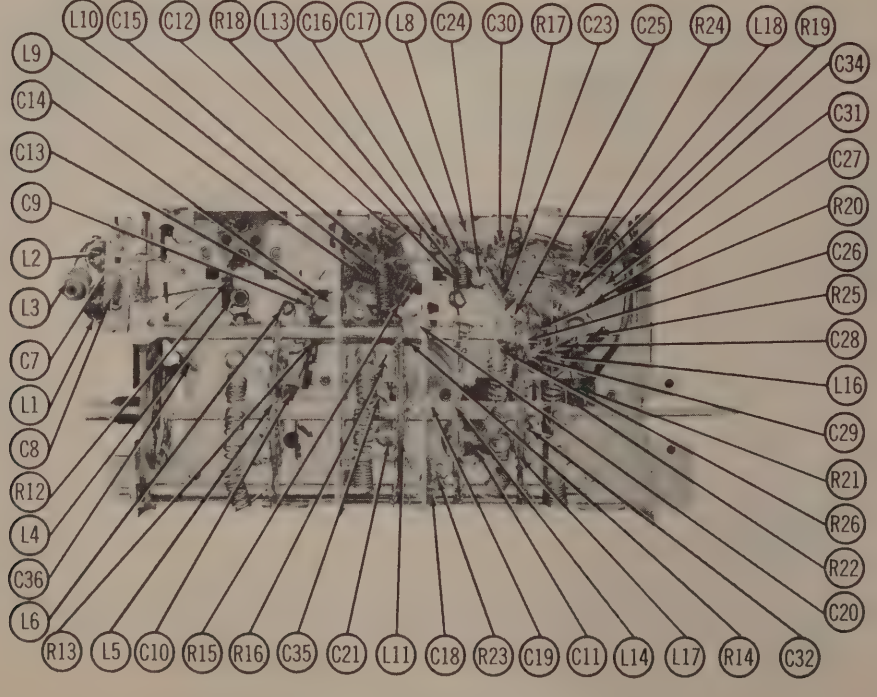
1. Short out the AGC voltage and shunt the horizontal oscillator coil (L38) to ground (chassis) with a .1MFD/400V capacitor. This may be done with the chassis in the cabinet by using the three pin socket on rear panel of chassis labeled "Test Receptacle".

2. Adjust the horizontal hold control to the point where the picture remains stable horizontally.

3. Remove the .1MFD capacitor from L38 and adjust the horizontal oscillator slug (B1) to the point where picture remains stable horizontally.

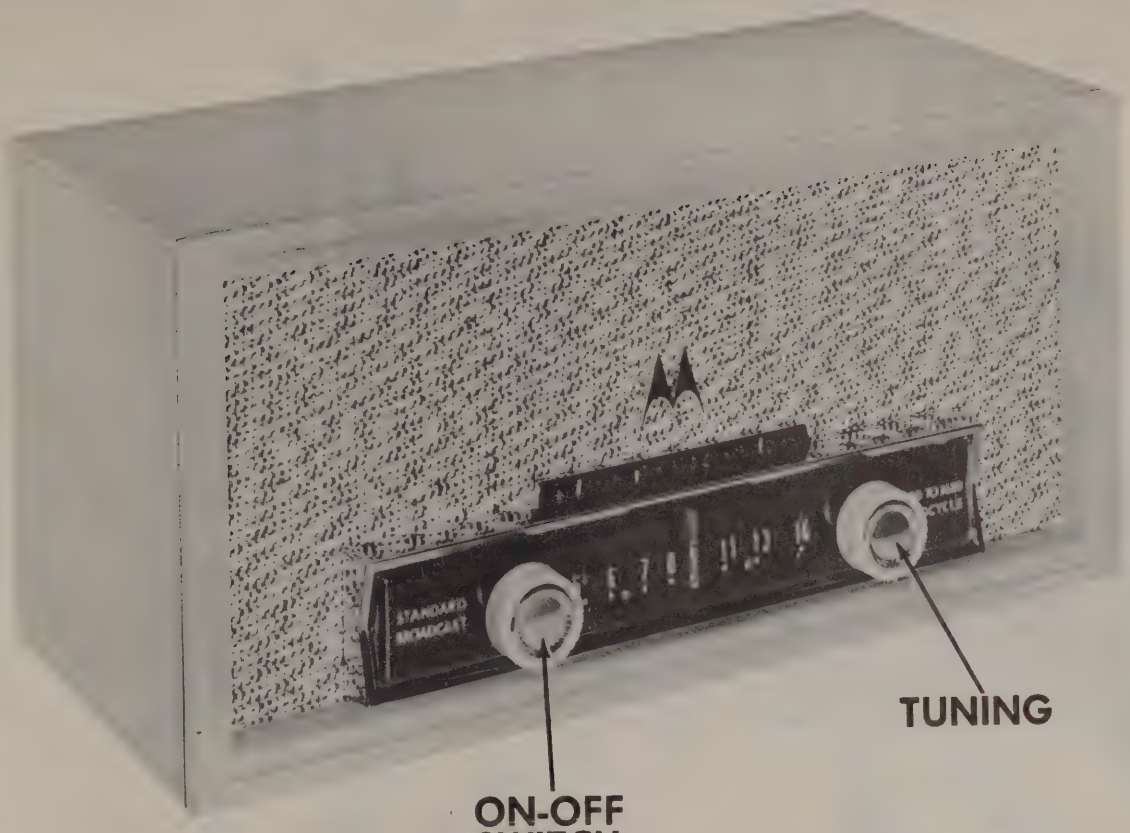
4. Remove short from AFC voltage and adjust the horizontal hold control until picture remains in sync over approximately 30 degrees of its range while switching off channel and back again.

Adjust the horizontal size control (located just above the left rear side of the chassis) for a picture slightly wider than necessary to fill the picture mask horizontally.



RF TUNER BOTTOM VIEW

MOTOROLA
MODELS 56W1, B (Ch. HS-476)



MOTOROLA
MODELS 56W1, B (Ch. HS-476)

TRADE NAME	Motorola Models 56W1, 56W1B (Ch. HS-476)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	530KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455K (400Ω Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop (Radiated)	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
MODEL 56WI (Ch. HS-476)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	23B634167	PRS150V4040-20	BBRT44215	TCT3285	TDL-404020-150	FMT-312	TVA-3448
B	30	150							
C	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	100		21R400537	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C3	.05	200	8R121005	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	.006	400	8R121001	SI6000		CUB6D6	GP3-333-602	PT626	6TM-D6	
C5	.006	400	8R121001	SI6000		CUB6D6	GP3-333-602	PT626	6TM-D6	
C6	100		21R400537	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C7	.01	200	8R121868	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C8	10000		21R121946	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C9	.047	400	8K490232	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C10	.1	600	8R121869	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	18A634110	ABT-73	A47F1-1Meg	Q13-137X	UT-438	Volume-Tap at 300KΩ
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.

RESISTORS

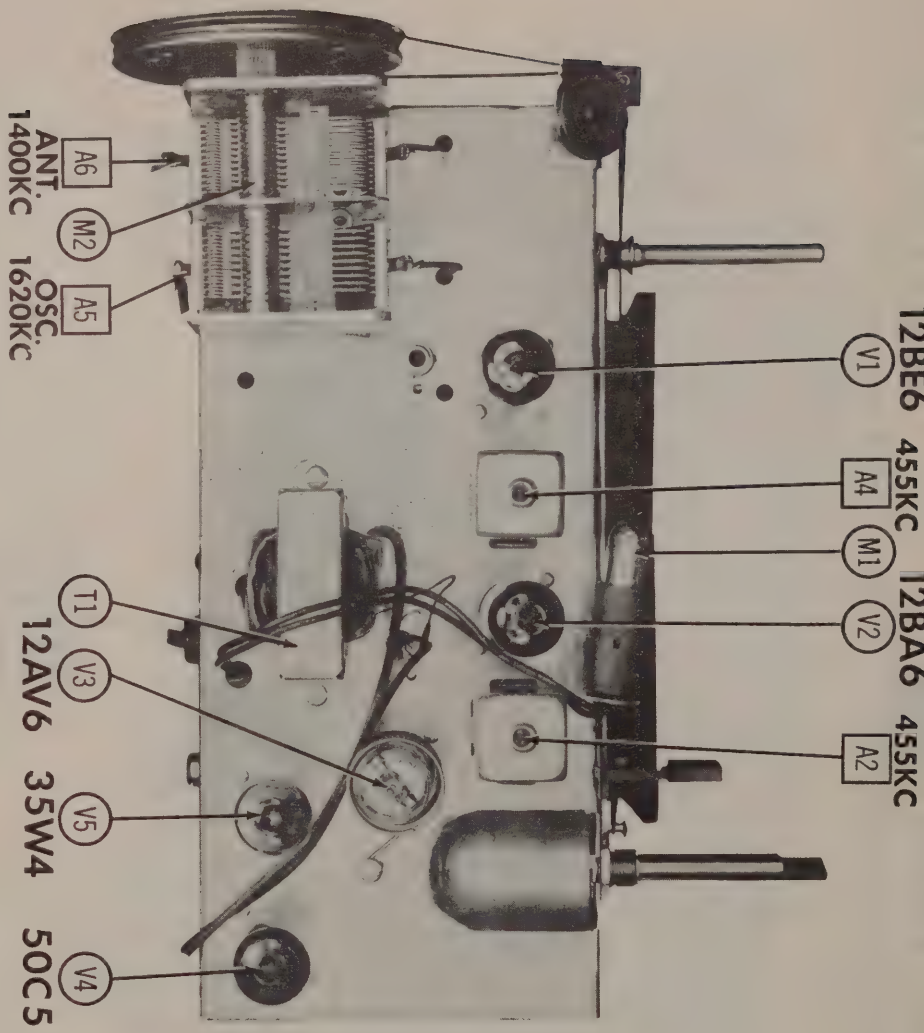
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	470KΩ	½	6R6032	BTS-470K	
R3	22KΩ	½	6R6028	BTS-22K	
R4	2.2Meg	½	6R3927	BTS-2.2Meg	
R5	82Ω	½	6R2035	BTS-82	
R6	33KΩ	½	6R6012	BTS-33K	
R7	39KΩ	½	6R6487	BTS-39K	
R8	10Meg	½	6R2109	BTS-10Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R9	470KΩ	½	6R6032	BTS-470K	
R10	470KΩ	½	6R6032	BTS-470K	
R11	150Ω	½	6R6373	BTS-150	
R12	15Ω	½	6R2034	BTS-15	
R13	390Ω	1	6R5598	BTA-390	
R14	390Ω	1	6R5598	BTA-390	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.65KΩ	3-4Ω	25C634161-A	Z1001	A3025	A3876	24S45	S-1X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	50C634311	4A07 ①	223S1	① Trim corners to fit.

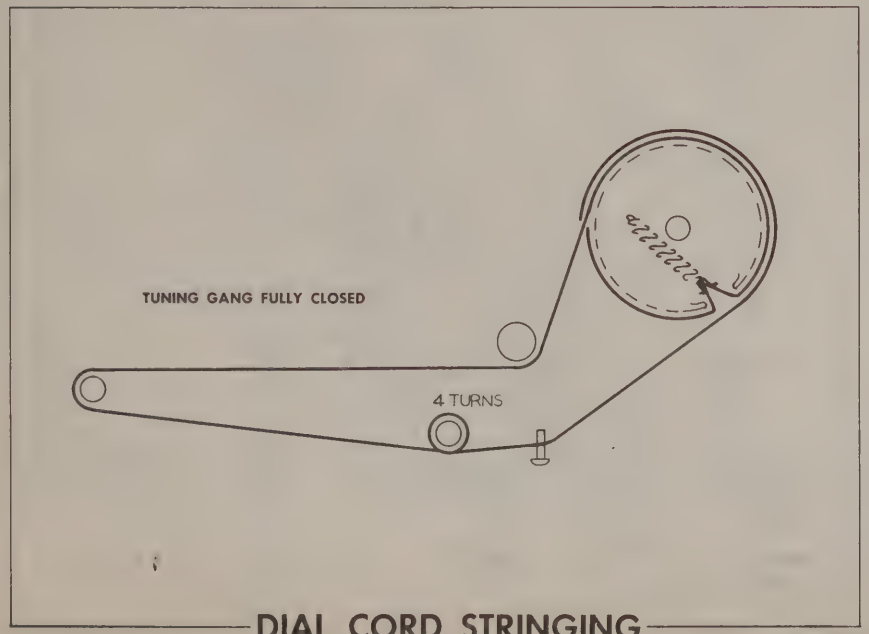
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.5Ω		24D634202				Includes Cabinet Back
L2	Osc. Coil	.9Ω	10Ω	24B634118	14-1073 *		69-Osc.	
L3	Input IF	16Ω	16Ω	24C632774	16-6758	BC-352	12-C1	
L4	Output IF	15Ω	15Ω	24C632775	16-6770	BC-355	12-C6	

* Leads sufficient mounting support.

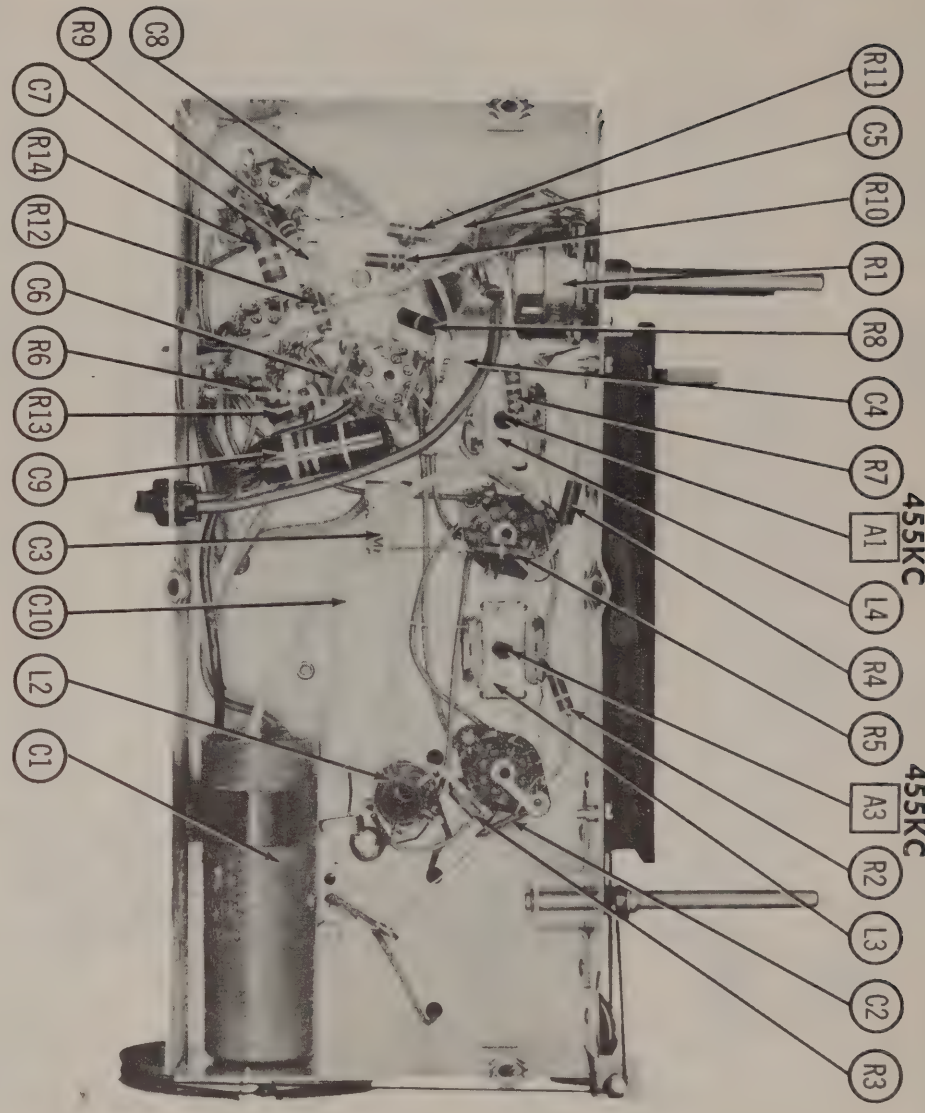
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Dial Light	65X11854	#47
M2	Tuning Cap.	19B634158	2 Gang (16-390MMF, 24-145MMF)
	Cabinet	16E634146	Model 56W1
	Cabinet	16K634147	Model 56W1B
	Knob	36K634194	Tuning
	Knob	36K634196	On-Off-Volume
	Dial Scale	61K634103	
	Dial Pointer	52K634509	
	Dial Background	64B634075	

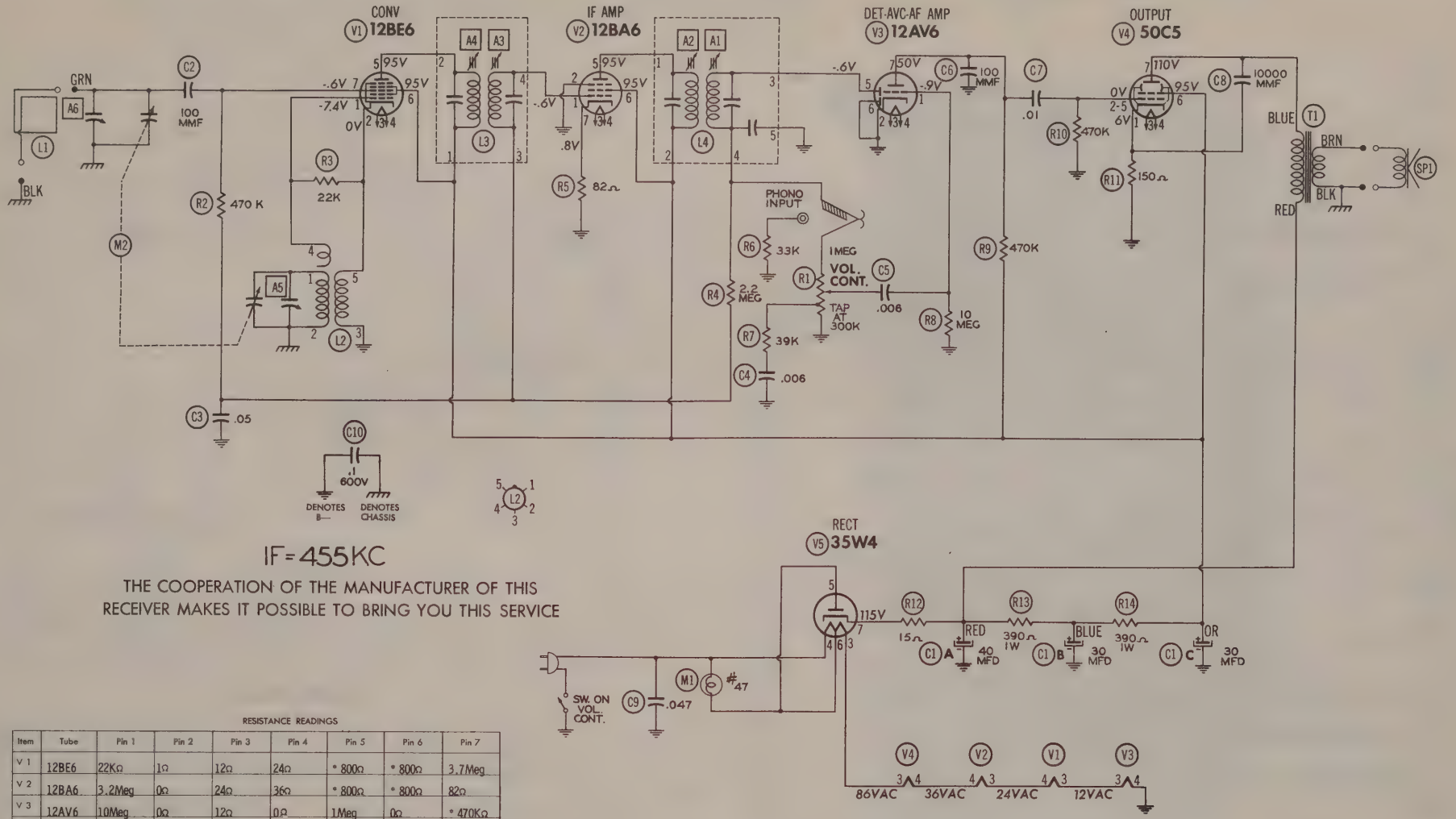


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 56W1 (Ch. HS-476)



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1Ω	12Ω	24Ω	* 800Ω	* 800Ω	3.7Meg
V 2	12BA6	3.2Meg	0Ω	24Ω	36Ω	* 800Ω	* 800Ω	82Ω
V 3	12AV6	10Meg	0Ω	12Ω	0Ω	1Meg	0Ω	* 470KΩ
V 4	50C5	150Ω	470KΩ	86Ω	36Ω	470KΩ	* 800Ω	* 150Ω
V 5	35W4	TP	TP	86Ω	117Ω	112Ω	112Ω	100KΩ

* MEASURED FROM PIN 7 OF V5.
TP-TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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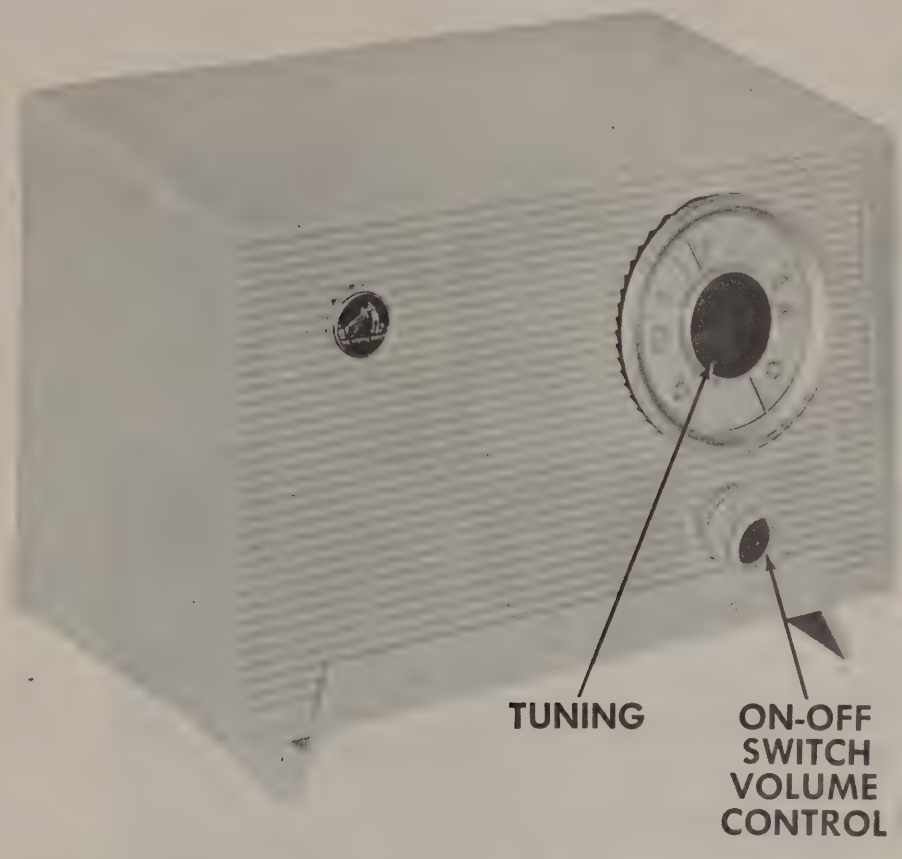
RCA VICTOR
MODELS 6-X-5A, B, C (Ch. RC-1157)

RCA VICTOR
MODELS 6-X-5A, B, C (Ch. RC-1157)



RCA VICTOR
MODELS 6-X-5A, B, C (Ch. RC-1157)

TRADE NAME	RCA Victor Models 6-X-5A, 6-X-5B, 6-X-5C (Ch. RC-1157)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 2, N. J.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 12BA6 (V2). Low side to B-.	455KC (400~ Mod.)	Point of non-interference	Across Voice Coil	A1	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to antenna stator lug. Low side to B-.	"	"	"	A2, A3	
3.		Loop (Radiated)	1620KC	Tuning gang fully open	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1400KC	Tune to 1400KC signal	"	A5	"
5.		"	600KC	Tune to 600KC signal	"	A6	Adjust for maximum output while rocking tuning gang.

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PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL 6-X-5A (Ch. RC-1157)

PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	101074	E58A180				CADP-512	R-2175 *
B	30	150							

*Unit must be ordered from mfgr.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400	73553	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C3	56		100085	SI56	D6-560	TP31	GPIK-560	UC-5456	5GA-Q56	
C4	4.7		77471							
C5A	220		♦ 101065		♦ PC-158					
B	5000									
C	5000									
D	250									
E										
C6	.015	400	101073	BPD-015	DD16-153				4SE-S15	
C7	.047	400	73553	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

♦ Items C5A, C5B, C5C, C5D, C5E, R7A, R7B and R7C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	972610-1					Volume & Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R2	22KΩ	½	502322	BTS-22K	
R3	100Ω	½	502110	BTS-100	
R4	100Ω	½	502110	BTS-100	
R5	3.3Meg	½	502533	BTS-3.3Meg	
R6	47KΩ	½	502347	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R7A	6.8Meg		♦ 101065	BTS-6.8Meg	
B	470K			BTS-470K	
C	470KΩ			BTS-470K	
R8	180Ω	½	502118	BTS-180	
R9	1200Ω	1	512212	BTA-1200	

♦ Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.7KΩ	3-4Ω	77993	Z1101	A3025	A3332	26S58 ①	S-12X	① Drill one new mtg. hole.

SPEAKER

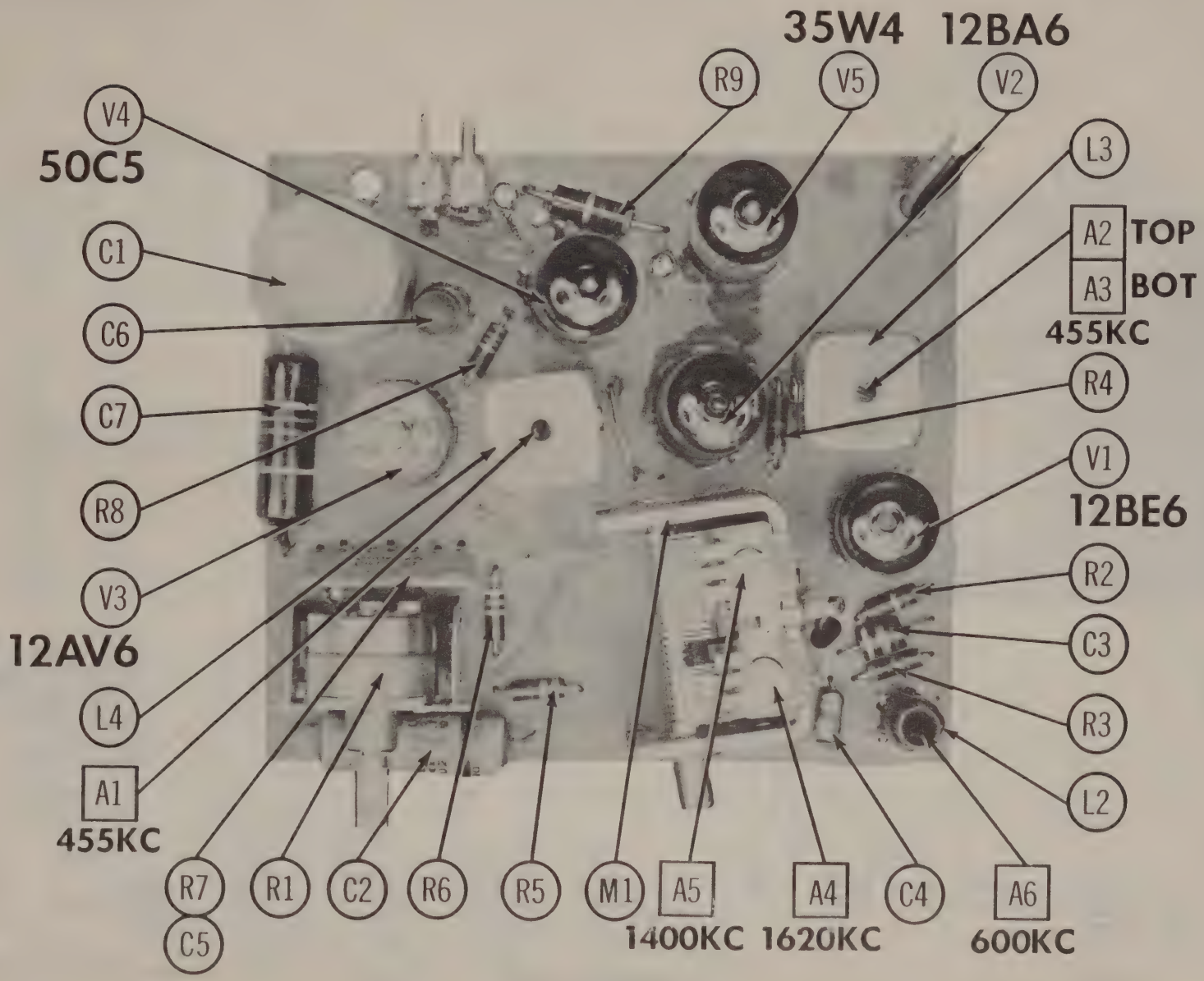
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	79696	4A07	223S1	

COILS (RF-IF)

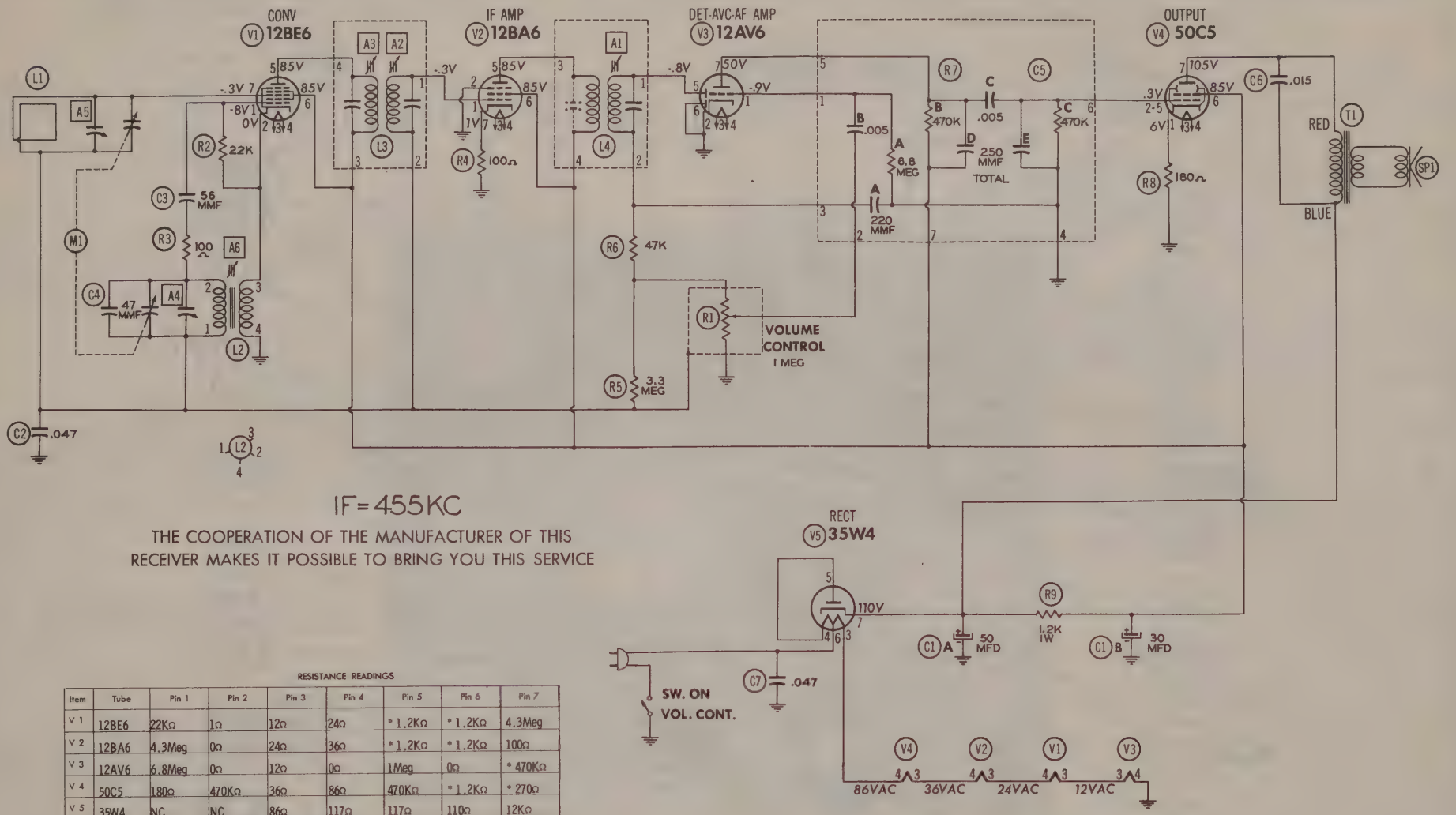
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.2Ω		101063				Includes Cabinet Back
L2	Osc. Coil	.7Ω	8.5Ω	101072				
L3	Input IF	14Ω	14Ω	101067	16-6780		13-PC1	
L4	Output IF	14Ω	25Ω	101066				

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M1	Tuning Cap.	101071	2 Gang (11-365MMF, 8-133MMF)
	Cabinet	Y2823	Model 6-X-5A
	Cabinet	Y2824	Model 6-X-5B
	Cabinet	Y2825	Model 6-X-5C
	Knob	101068	Tuning
	Knob	101062	On-Off-Volume



CHASSIS-TOP VIEW



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1Ω	12Ω	24Ω	* 1.2KΩ	* 1.2KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	24Ω	36Ω	* 1.2KΩ	* 1.2KΩ	100Ω
V 3	12AV6	6.8Meg	0Ω	12Ω	0Ω	1Meg	0Ω	* 470KΩ
V 4	50C5	180Ω	470KΩ	36Ω	86Ω	470KΩ	* 1.2KΩ	* 270Ω
V 5	35W4	NC	NC	86Ω	117Ω	117Ω	110Ω	12KΩ

* MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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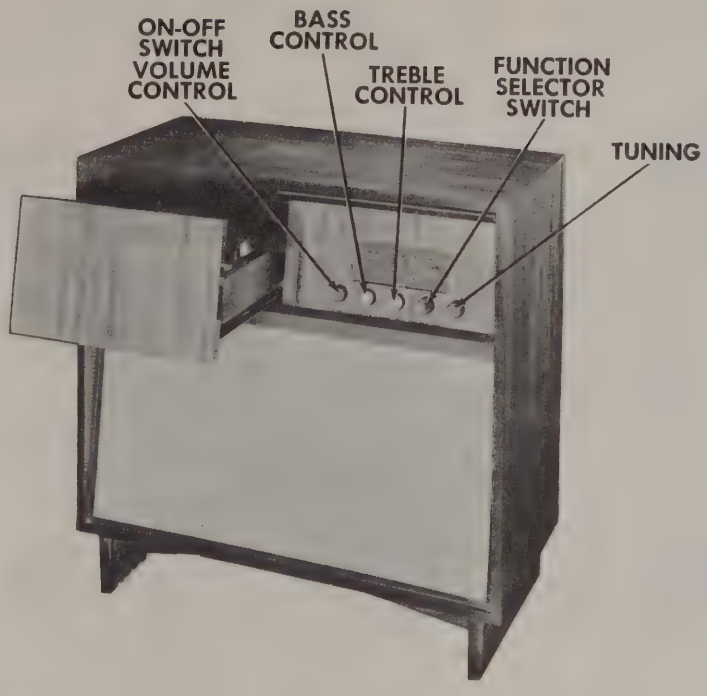
RETMA MEMBER

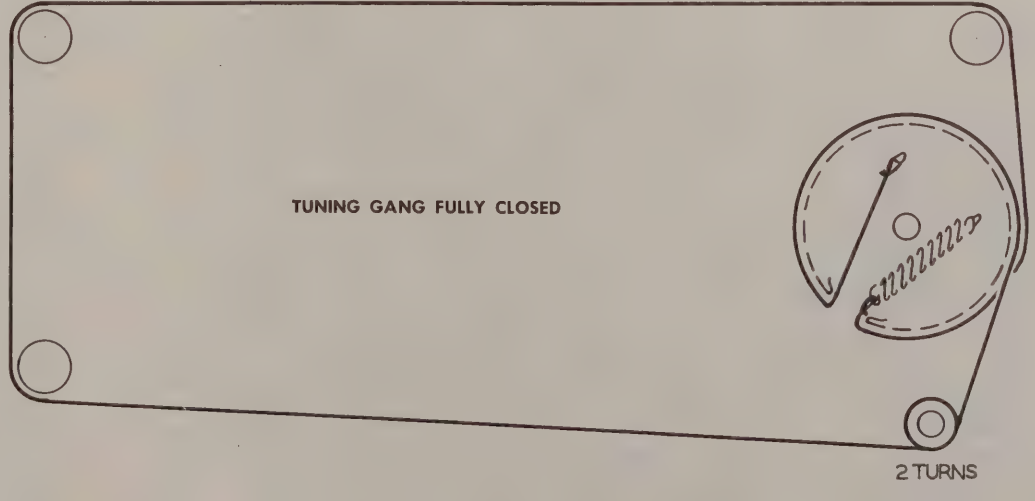


ROLAND
MODEL 10XF2

ROLAND
MODEL 10XF2

TRADE NAME	Roland Model 10XF2	
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N.Y.	
TYPE SET	AC Operated AM-FM-Phono Combination Superheterodyne Receiver	
TUBES	Eleven	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATINC .70 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1650KC	FREQ. MOD. 88-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET 216 - FOLDER 11 OR RECORD CHANGER MANUAL CM-5.



DIAL CORD STRINGING

PROPERTY OF
L. F. [illegible]
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DENVER, COLORADO

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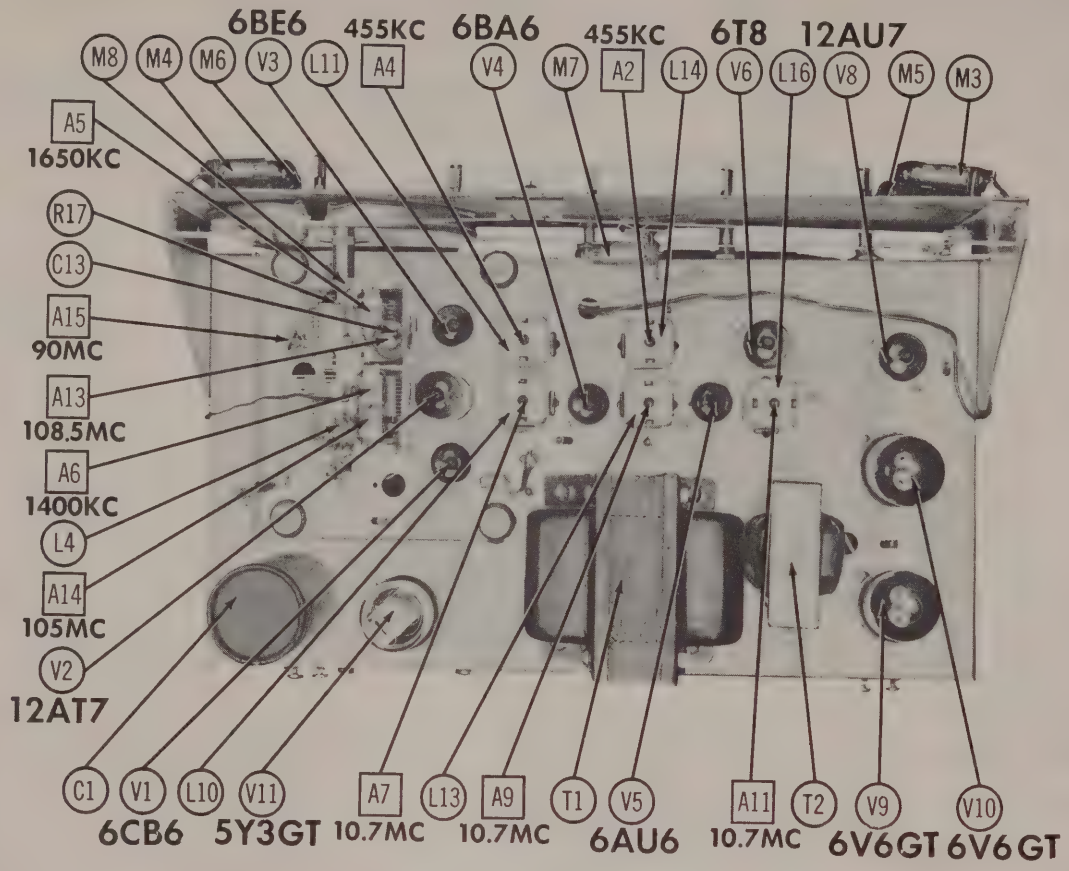
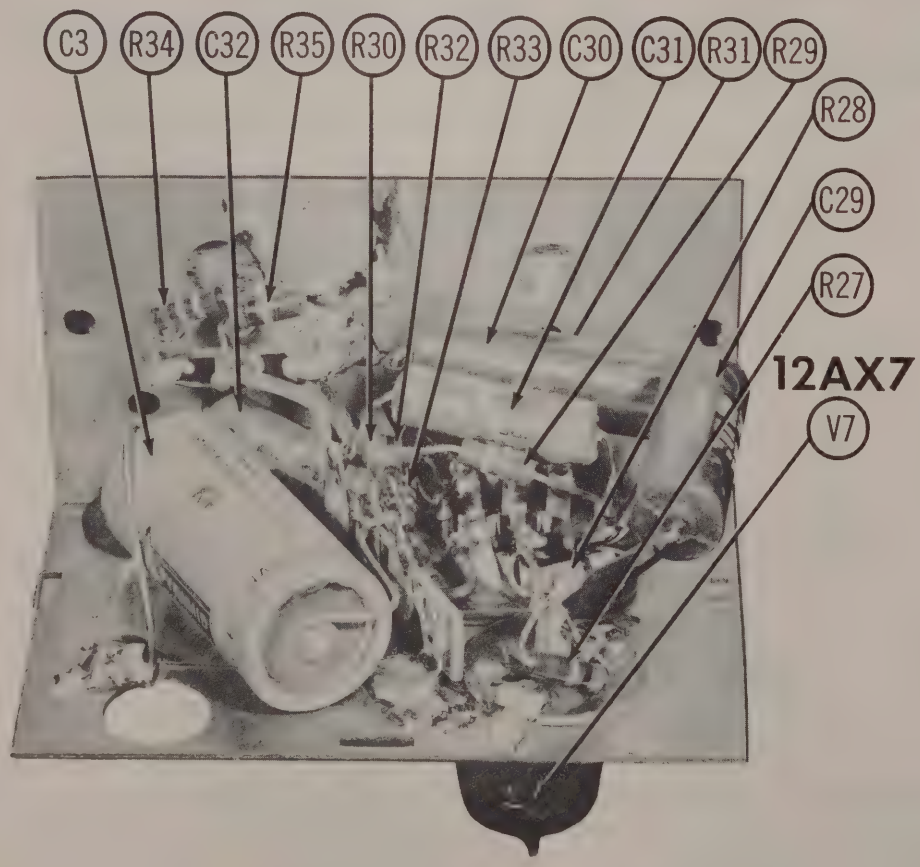
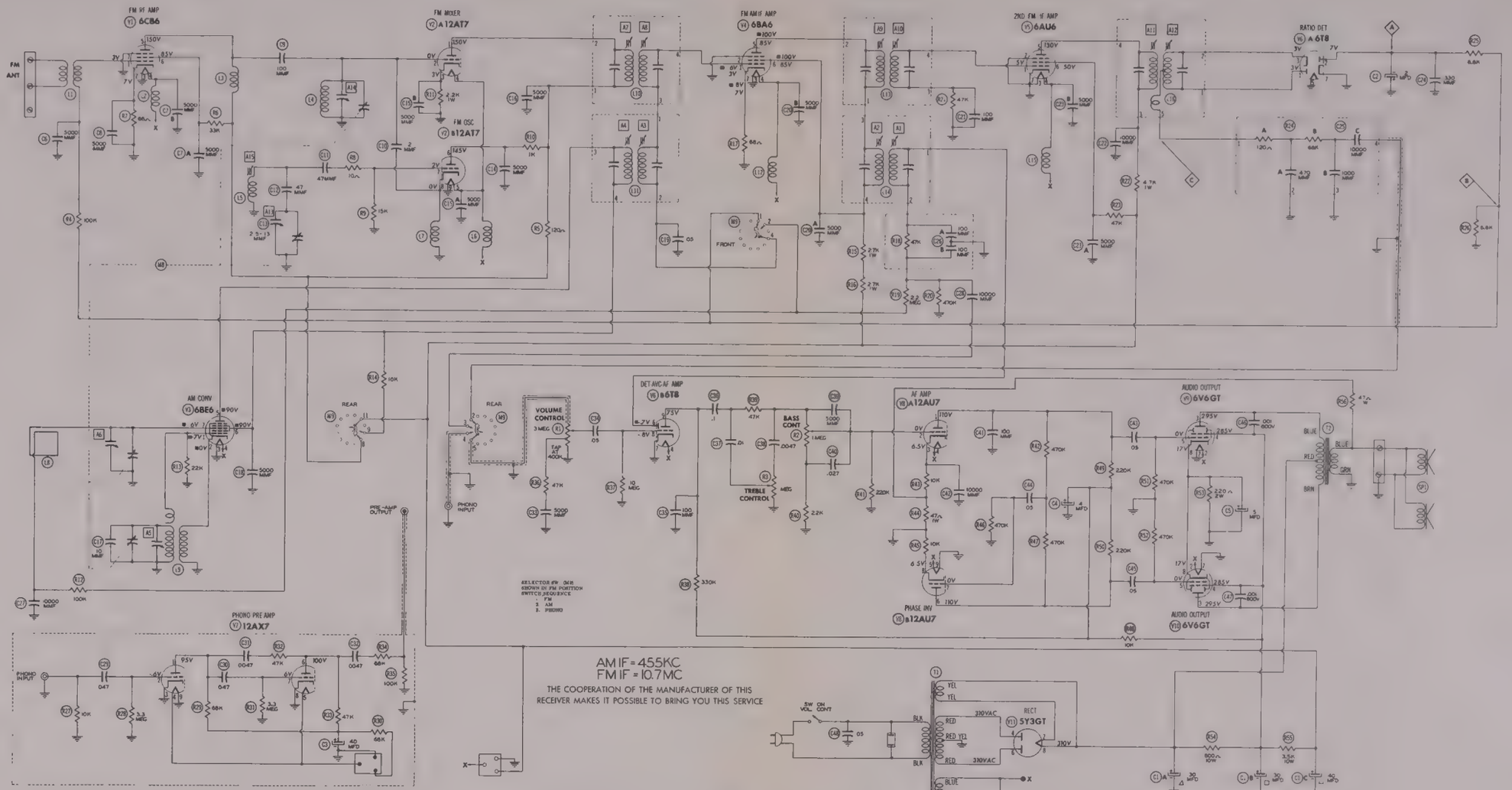


CHASSIS TOP VIEW



CHASSIS-PHONO PREAMP.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V-1	6CB6	104KΩ	680	00	.1Ω	0 to 1KΩ	0 to 37.1KΩ	20Ω		
V-2	12AT7	0 to 4.2KΩ	0Ω	2.2KΩ	1Ω	.1Ω	0 to 5.2KΩ	.5KΩ	.2Ω	0Ω
V-3	6BE6	22KΩ	.5Ω	0Ω	1Ω	0 to 14.1KΩ	0 to 4.1KΩ	∞ 2.1Meg		
V-4	6BA6	0 to 1.5Meg	0Ω	20Ω	.1Ω	0 to 1.5KΩ	0 to 9.5KΩ	68Ω		
V-5	6AU6	47KΩ	0Ω	0Ω	.1Ω	0 to 1.8KΩ	0 to 55.1KΩ	50Ω		
V-6	6T8	INF	.45.6KΩ	INF	1Ω	90Ω	81TKΩ	50Ω	150Meg	0 to 340KΩ
V-7	12AX7	0 to 140KΩ	2.2Meg	20Ω	1Ω	.1Ω	0 to 120KΩ	0 to 304Meg	0Ω	0Ω
V-8	12AU7	0 to 220KΩ	0 to 220KΩ 10MΩ	10MΩ	.1Ω	.1Ω	0 to 230KΩ	470KΩ	10KΩ	0Ω
V-9	6V6GT	INC	.1Ω	0 to 200Ω	0 to 200Ω	470KΩ	INC	0Ω	330Ω	
V-10	6V6GT	INC	1Ω	0 to 200Ω	0 to 200Ω	470KΩ	INC	0Ω	330Ω	
V-11	5Y3GT	INC	330KΩ	INC	78Ω	TP	TP	78Ω	INC	500KΩ

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS DESIGNATED OTHERWISE
† MEAS. RED FROM PIN 8 OF VOL
∞ MEASURED IN AM POSITION
†† BASS CONTROL SET AT MAXIMUM CLOCKWISE POSITION.
TP-TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter
2. AC voltages measured at 1000 ohms per volt
3. Socket connections are shown as bottom views
4. Measured d.c. volts are from socket pin to common negative
5. Line voltage maintained at 117 volts for voltage readings
6. Normal tolerance on components should make it possible a variation of ± 15% in voltage and resistance readings
7. Volume control at maximum, no signal applied for voltage measurements

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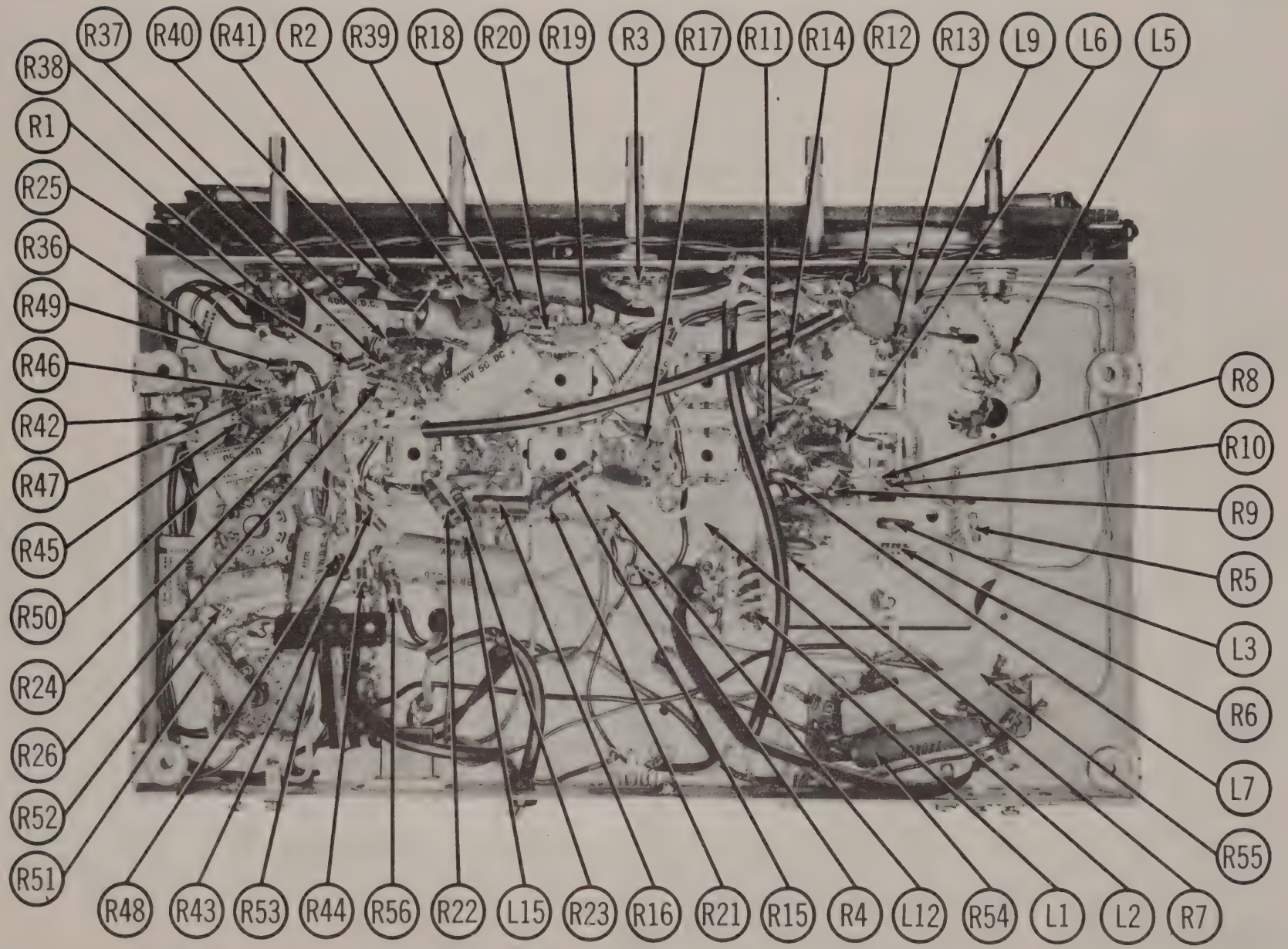
316-13



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

ROLAND
MODEL 10XF2

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set tone control at treble position.
Tuning gang fully open and set pointer 1½" from right hand edge of dial backplate.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1650KC	"	"	"	A5	"
3.		Loop	1400KC	"	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.1MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A7, A8, A9, A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
5.	"	"	"	"	"	DC probe thru 1Meg to point Ⓑ. Common to point Ⓒ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.1MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	Vert. Amp. to point Ⓐ. Low side to chassis.	A7, A8, A9, A10, A11	Disconnect stabilizer capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. thru 1Meg to point Ⓑ. Low side to chassis.	A12	Reconnect capacitor (C2). Adjust A12 so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

* Adjustments necessary only for proper tracking or to cover FM range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	270Ω Carbon Resistors	High side to FM antenna terminal. Low side to chassis.	108.5MC (Unmod)	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A13	Adjust for maximum deflection.
7.	"	"	105MC	"	Tune to 105MC signal	"	A14	"
8.	"	"	87.5MC	"	Tuning gang fully closed	"	L4*	Compress or expand L3 for maximum deflection.
9.	"	"	108.5MC	"	Tuning gang fully open	"	A13 *	Adjust for maximum deflection.
10.	"	"	90MC	"	Tune to 90MC signal	"	A15 *	"

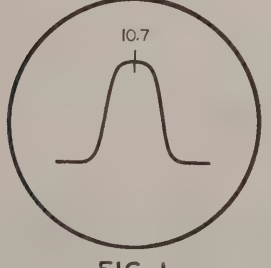


FIG. 1

FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		ROLAND PART No.	STANDARD REPLACEMENT	
V1	FM RF Amplifier	6CB6	6CB6	
V2	FM Mixer - Osc.	12AT7	12AT7	
V3	AM Converter	6BE6	6BE6	
V4	FM - AM IF Amplifier	6BA6	6BA6	
V5	FM IF Amplifier	6AU6	6AU6	
V6	Ratio Det - AM Det. - AVC-AF Amplifier	6T8	6T8	
V7	Phono Preamplifier	12AX7	12AX7	
V8	AF Amplifier - Phase Inverter	12AU7	12AU7	
V9	Output	6V6GT	6V6GT	
V10	Output	6V6GT	6V6GT	
V11	Rectifier	5Y3GT	5Y3GT	

ELECTROLYTIC CAPACITORS

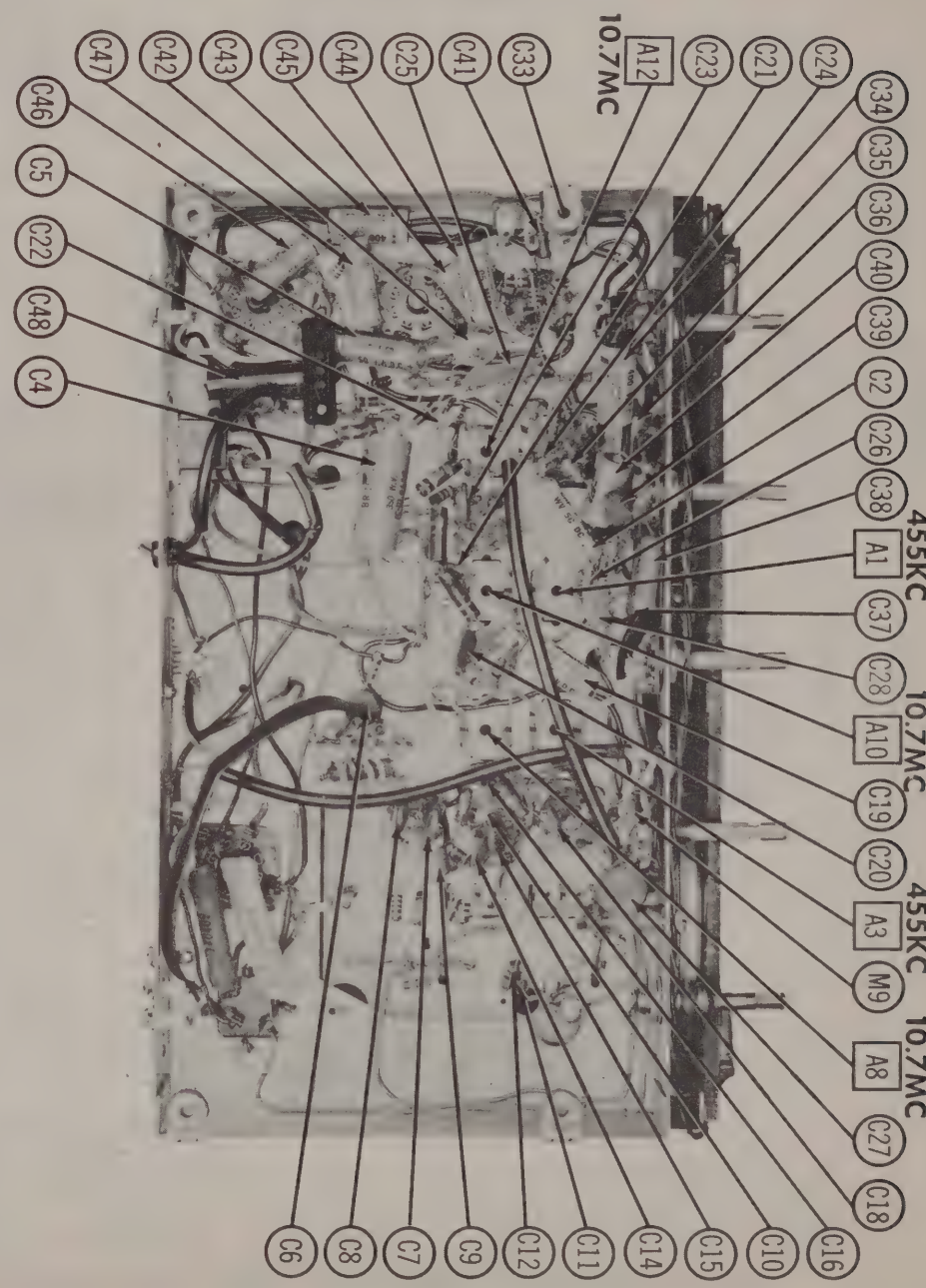
ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲30	450		AFH3-44	C156	FP396.14	TM-T40-450	T-170	TVL-3787
B	■30	450							
C	▲40	450							
C2	2	50		PRS50V2	BBR2-50	TC302	TD-2-50	MMT-0505	TVA-1301
C3	40	150		PRSI50V40	BR4015	TC48	TD-40-150	FM-1540	TVA-1413
C4	4	350		PRS350V4	BR435	TC60	TD-4-450	FM-4504	TVA-1601
C5	5	50		PRSI50V4	BR550	TC30	TD-5-50	MMT-0505	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C7A	5000			BPD-2X0047	DD2-502	DK079	811-005	DC525	5HK-2D47	
B	5000						811-005	DC525		
C8	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C9	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C10	2			NPO-SI22	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C11	47			SI47	D6-470	TP29	GP1K-470	UC-5347	5GA-Q47	
C12	47			SI47	D6-470	TP29	GP1K-470	UC-5347	5GA-Q47	
C13	2.5-13				822-BZ					
C14	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C15A	5000			BPD-2X0047	DD2-502	DK079	811-005	DC525	5HK-2D47	
B	5000						811-005	DC525		
C16	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C17	10			NPO-SI10	TCZ-10	TZ09	NPOA-100	ZT-541	5TCC-Q1	
C18	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C19	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C20A	5000			BPD-2X0047	DD2-502	DK079	811-005	DC525	5HK-2D47	
B	5000						811-005	DC525		
C21	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C22	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C23A	5000			BPD-2X0047	DD2-502	DK079	811-005	DC525	5HK-2D47	
B	5000						811-005	DC525		
C24	330			SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C25A	470			SI470	†PC-225	TP46	811-471	UC-5347	5GA-T47	
B	1000			SI1000		TP52	801-001	DC521	5HK-D1	
C	10000			BPD-01		K082	811-01	DC511	5HK-S1	
C26A	100		† PA-97-1		† PC-50	† 111TM1	† 1403-01	UC-531 UC531	† D-1	
B	100									
C27	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C28	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C29	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C30	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C31	.0047	400		SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C32	.0047	400		SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C33	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C34	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C35	100			NPO-SI100	D6-101	5R5T1	801-101	ZT-531	5TCC-T1	

CHASSIS BOTTOM VIEW CAPACITORS IDENT.



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C36	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C37	.01	200		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C38	.0047	400		SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C39	5000			BPD-005	DD-502	K082	811-005	DC525	5HK-D5	
C40	.027	400								
C41	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C42	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C43	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C44	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C45	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C46	.001	600		SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C47	.001	600		SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C48	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	

•Items C25A, C25B, C25C, R24A, and R24B are combined in one unit.
† Items C26A, C26B, and R18 are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3Meg	½	VC-67	ABT-8515	A47F-3Meg		UT-457	Volume-Tapped at 400KΩ
B	Shaft		Not Req.	AK-4	KSS-3		Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12		US-26	Attach to R1A
R2A	1Meg	½	VC-66	AB-69	A47-1Meg-S	Q11-137	U-54	Bass
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½	VC-66	AB-69	A47-1Meg-S	Q11-137	U-54	Treble
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	ROLAND PART No.	IRC PART No.	NOTES
R4	100KΩ	½		BTS-100K	
R5	120Ω	½		BTS-120	
R6	33KΩ	½		BTS-33K	
R7	68Ω	½		BTS-68	
R8	10Ω	½		BTS-10	
R9	15KΩ 5%	½		BTS-15K 5%	
R10	1000Ω	½		BTS-1000	
R11	2200Ω	1		BTA-2200	
R12	100KΩ	½		BTS-100K	
R13	22KΩ	½		BTS-22K	
R14	10KΩ	½		BTS-10K	
R15	2700Ω	1		BTA-2700	
R16	2700Ω	1		BTA-2700	
R17	68Ω	½		BTS-68	
R18	47KΩ	½	†	BTS-47K	
R19	2.2Meg	½		BTS-2.2Meg	
R20	470KΩ	½		BTS-470K	
R21	47KΩ	½		BTS-47K	
R22	4700Ω	1		BTA-4700	
R23	47KΩ	½		BTS-47K	
R24A	120Ω		•†	BTS-120	
B	68KΩ			BTS-68K	
R25	6800Ω	½		BTS-6800	
R26	6800Ω	½		BTS-6800	
R27	10KΩ	½		BTS-10K	
R28	3.3Meg	½		BTS-3.3Meg	
R29	68K	½		BTS-68K	
R30	68K	½		BTS-68K	
R31	3.3Meg	½		BTS-3.3Meg	
R32	47KΩ	½		BTS-47K	
R33	47KΩ	½		BTS-47K	
R34	68KΩ	½		BTS-68K	
R35	100KΩ	½		BTS-100K	
R36	47KΩ 5%	½		BTS-47K 5%	
R37	10Meg	½		BTS-10Meg	
R38	330KΩ 5%	½		BTS-330K	
R39	47KΩ	½		BTS-47K	
R40	22KΩ 5%	½		BTS-22K 5%	
R41	220KΩ 5%	½		BTS-220K 5%	
R42	470KΩ	½		BTS-470K	
R43	10KΩ	½		BTS-10K	
R44	47Ω	1		BTA-47	
R45	10KΩ	½		BTS-10K	
R46	470KΩ	½		BTS-470K	
R47	470KΩ	½		BTS-470K	
R48	10KΩ	½		BTS-10K	
R49	220KΩ 5%	½		BTS-220K	
R50	220KΩ	½		BTS-220K	
R51	470KΩ	½		BTS-470K	
R52	470KΩ	½		BTS-470K	
R53	220Ω	2		BTB-220	
R54	600Ω	10		1 3/4A-600	
R55	3500Ω	10		1 3/4A-3500	
R56	47Ω	1		BTA-47	

† Items C26A, C26B, R18 are combined in one unit.
•Items C25A, C25B, C25C, R24A, R24B are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.7A	600VCT .082ADC	5VAC @ 2A	6.3VAC @2.6A		P9312			22R04 ①	

① Used Universal mounting brackets.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7.2KΩ	11.2Ω		Z1011	A-2904 ①	A-3870	26S46 ①	S-55X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	ROLAND PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	12"	PM	11.2Ω		12A6C0		Coaxial type speaker

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	ROLAND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Trans.	0Ω	0Ω					
L2	Fil. Choke	0Ω			19-1001		4604	1.4 Microhenries
L3	RF Coil	.2Ω			19-1002		4606	2.7 Microhenries
L4	FM RF Coil	0Ω						
L5	FM Osc. Coil	0Ω						
L6	Fil. Choke	.5Ω			19-1004		4610	5.8 Microhenries
L7	Cathode Choke	.2Ω			19-1002		4606	2.7 Microhenries
L8	AM Loop Ant.	1.3Ω						
L9	AM Osc. Coil	.7Ω	5.5Ω		14-1073 *		69-OSC ■	
L10	1st. FM IF	.7Ω	.7Ω	LF-58	16-3487	FM-254	1463	
L11	1st. AM IF	15Ω	15Ω	LF-54	16-6758	BC-352	12-C1	
L12	Fil. Choke	0Ω			19-1001		4604	1.4 Microhenries
L13	2nd. FM IF	.7Ω	.7Ω	LF-52	16-3487	FM-254	1463	
L14	2nd. AM IF	10Ω	10Ω	LF-59	16-6758	BC-353	12-C2	
L15	Fil. Choke	0Ω			19-1001		4604	1.4 Microhenries
L16	Ratio Detector	1.6Ω	.9ΩCT	LF-53	17-3488 ▲	FM-255	1465	Tertiary winding -.4Ω

* Leads sufficient mounting support.
■ Drill new mounting hole.
▲ Enlarge chassis hole and drill mounting hole.

PHONO CARTRIDGE

ITEM No.	ROLAND PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1						

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	ROLAND PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		†G-13 or •†G-13SD or •G-13D	†AC-410 or •†AC-410D1 or •AC-410D	†W-68TPS or •†W-68DS or •W-68TPD	†Jewel • Diamond

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M3	Dial Light		#51 - FM Dial
M4	Dial Light		#51 - FM Dial
M5	Dial Light		#51 - AM Dial
M6	Dial Light		#51 - AM Dial
M7	Dial Light		#51 - Phono position
M8	Tuning Cap.	CV-66	4 Gang (AM Sections: 32-500MMF, 21-185MMF)
M9	Switch		Selector (Rotary-wafer type)

SENTINEL
MODELS 1U-354P, 1U-154-2P

SENTINEL
MODELS 1U-354P, 1U-154-2P

SENTINEL
MODELS 1U-354P, 1U-154-2P

TRADE NAME	Sentinel Models 1U-354P, 1U-354-2P
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster, Evanston, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (or) 3 Volts "A" Supply & 67.5 Volts "B" Supply
RATING	.15 Amp. @ 117 Volts AC (or) 150 MA @ 3 Volts DC & 8.5 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540KC-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.02MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. IF AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.	"	"	1650KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

SENTINEL MODEL 1U-354P

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		SENTINEL PART No.	STANDARD REPLACEMENT	
V1	Converter	1R5	1R5	
V2	IF Amplifier	1U4	1U4	
V3	Det.-AVC-AF Amp.	1U5	1U5	
V4	Output	3V4	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SENTINEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	25E72	PRS150/25V 4040/100	BBRT5315C10	3N537	TDL-4412	FMT-331	TVA-3427
B	40	150							
C	100	10							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SENTINEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	23E3214	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C3	100		23E4000-17	BPD-0001	D6-10¢	G042	GP1K-101	UC-531	5GA-T1	
C4	.1	400	23E3416	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C5	10000		23E4004-17	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6A	150									
B	2000									
C	150		•23E2041-8							
D	10000									
E	5000									
C7	5000		23E4004-15	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C8	.1	200	23E2043-9	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C9	.22	100	23E2043-3	P288N-22		CUB2P22		PT4022	2TM-P22	
C10	20000		23E4004-19	BPD-02	DD-203	K085	817-02		5HK-S2	

•Items C6A, C6B, C6C, C6D, C6E, R13A, R13B, R13C and R13D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SENTINEL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	28E98	B-76-S	A47-2Meg-Z	Q13-139	U-55	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	Not Req.	SWE-20	76-2	US-27	Attach to R1A.

RESISTORS

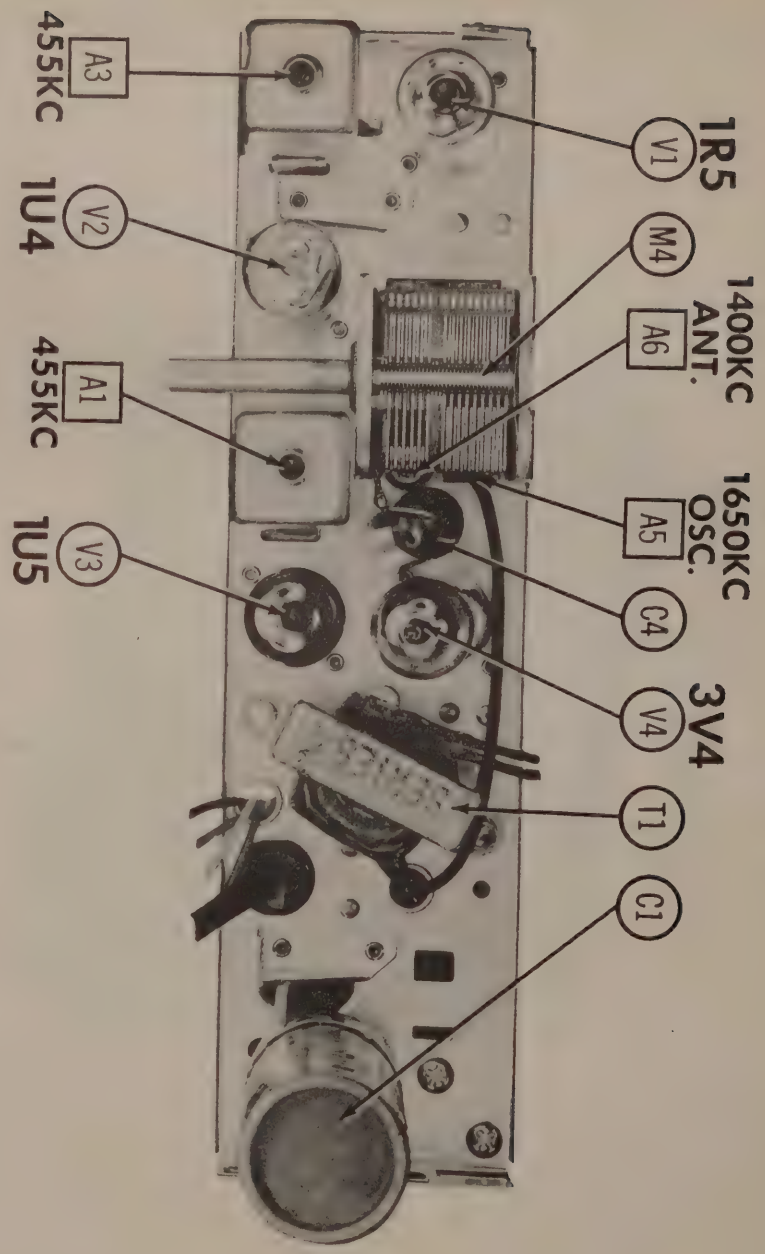
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SENTINEL PART No.	IRC PART No.	
R2	68KΩ	½	27E683K-½	BTS-68K	
R3	470KΩ	½	27E474M-½	BTS-470K	
R4	6800Ω	½	27E682K-½	BTS-6800	
R5	680Ω	½	27E681K-½	BTS-680	
R6	1Meg	½	27E105M-½	BTS-1Meg	Note 1
R7	4.7Meg	½	27E475M-½	BTS-4.7Meg	
R8	4.7Meg	½	27E475M-½	BTS-4.7Meg	
R9	680Ω	½	27E681K-½	BTS-680	
R10	270Ω	½	27E271K-½	BTS-270	
R11	330Ω	½	27E331K-½	BTS-330	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SENTINEL PART No.	IRC PART No.	
R12	220KΩ	½	27E224M-½	BTS-220K	
R13A	4.7Meg			BTS-4.7Meg	
B	4.7Meg		•23E2041-8	BTS-4.7Meg	
C	1Meg			BTS-1Meg	
D	2.2Meg			BTS-2.2Meg	
R14	27Ω	½	27E270K-½	BTS-27	
R15	270Ω	½	27E271K-½	BTS-270	
R16	1500Ω	4	27E1025-2	PW4-1500	
R17	610Ω	3	27E1025-3		
R18	68Ω	1	27E1024		

Note 1. Not used in some versions.

• Items R13A, R13B, R13C, R13D, C6A, C6B, C6C, C6D, C6E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SENTINEL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	12KΩ	3.4Ω	22E87		A-2999				

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SENTINEL PART No.	QUAM PART No.	RCA TYPE No.	
SP1	3½"	PM	3.4Ω	1E53-2	3A07	216S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SENTINEL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.9Ω		64E37				
L2	Osc. Coil	2.3Ω	10Ω	20E837	14-1074	BC-394	70-OSC *	
L3	Input IF	16Ω	16Ω	20E825	16-6758	BC-352	12-C1	
L4	Output IF	16Ω	16Ω	20E825	16-6758	BC-353	12-C2	

*Use leads for mounting support.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	SENTINEL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.065A	57E15	1003A	RS075	6S75	5M4	75	

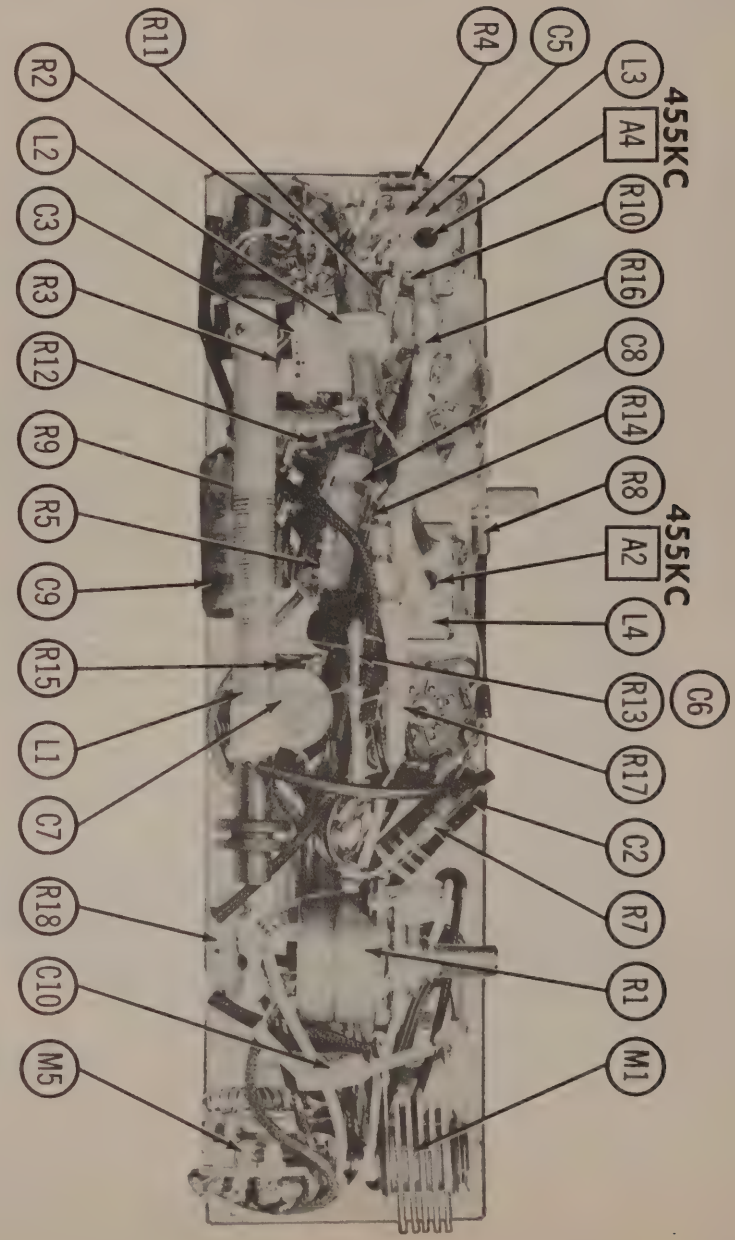
BATTERIES

ITEM No.	VOLTAGE	SENTINEL PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	1.5V "A"		950			2R			Connect 2 in series.
M3	67.5V "B"			477			P45		

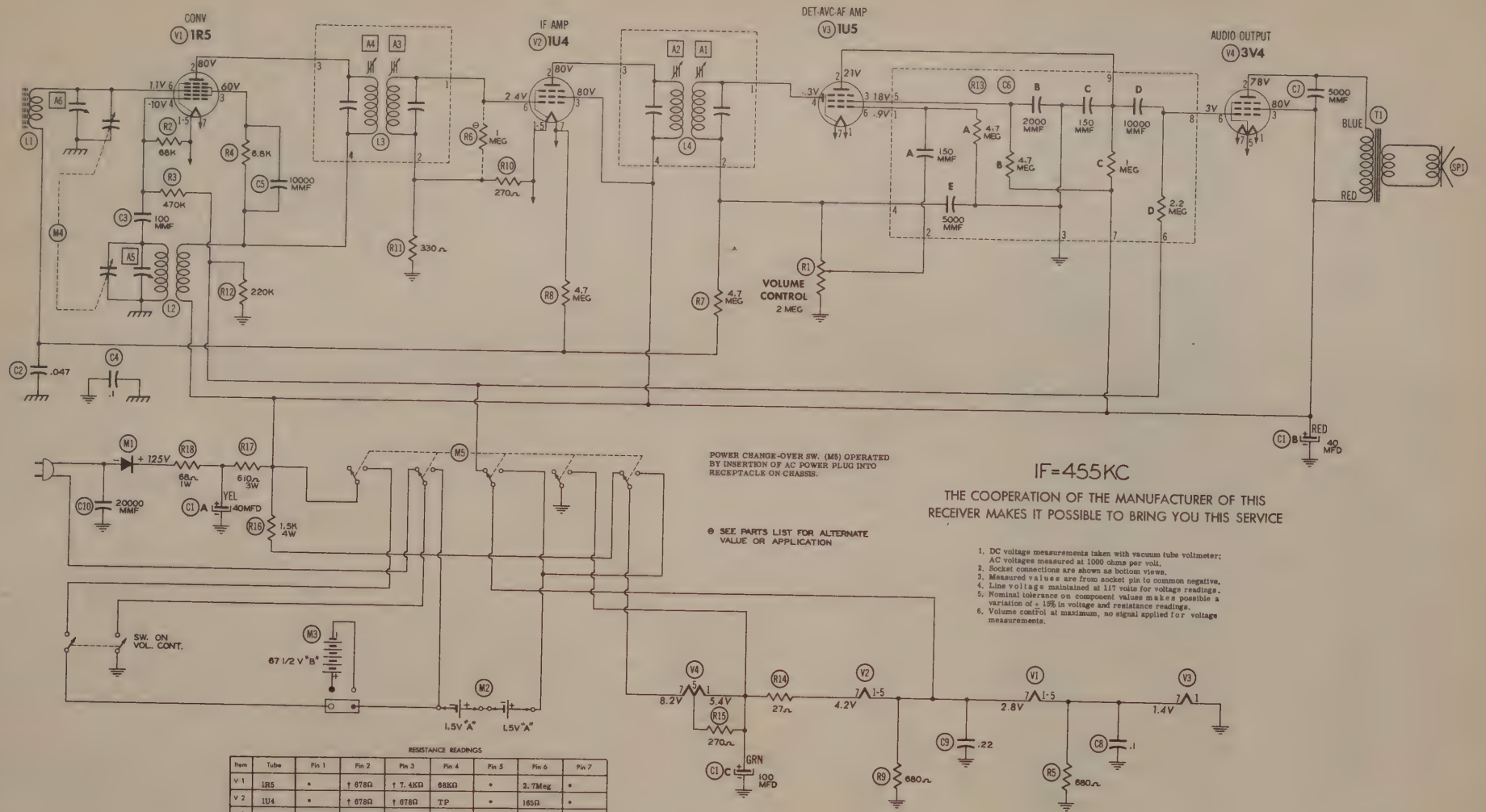
MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
M4	Tuning Cap.	24E62	2 Gang (16-215MMF, 17-115MMF)
M5	Switch	29E20	Power changeover (5 pole - 2 position, rotary, wafer type)
	Cabinet	20E918	Complete - Ebony
	Cabinet	20E918-2	Complete - Green
	Cabinet	20E918-3	Complete - Ivory
	Cabinet	20E918-4	Complete - Tan
	Cabinet	20E918-5	Complete - Mahogany
	Cabinet	20E918-6	Complete - Red
	Cabinet	20E918-7	Complete - Rust
	Knob	37E82-2	On-off-volume
	Dial	35E36-2	Tuning

CHASSIS—BOTTOM VIEW



SENTINEL MODEL IU-354P



POWER CHANGE-OVER SW. (M5) OPERATED BY INSERTION OF AC POWER PLUG INTO RECEPTACLE ON CHASSIS.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	•	† 678Ω	† 7. 4KΩ	68KΩ	•	2. 7Meg	•
V 2	1U4	•	† 678Ω	† 678Ω	TP	•	165Ω	•
V 3	1U5	0Ω	† 1Meg	† 4. 7Meg	2Meg	TP	4. 7Meg	•
V 4	3V4	•	† 1. 4KΩ	† 678Ω	NC	•	2. 2Meg	•

† MEASURED FROM OUTPUT OF M1.
• DO NOT USE OHMETER TO MEASURE FILAMENT RESISTANCE.
TP-TIE POINT
NC-NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PHOTOFACT* Folder

TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

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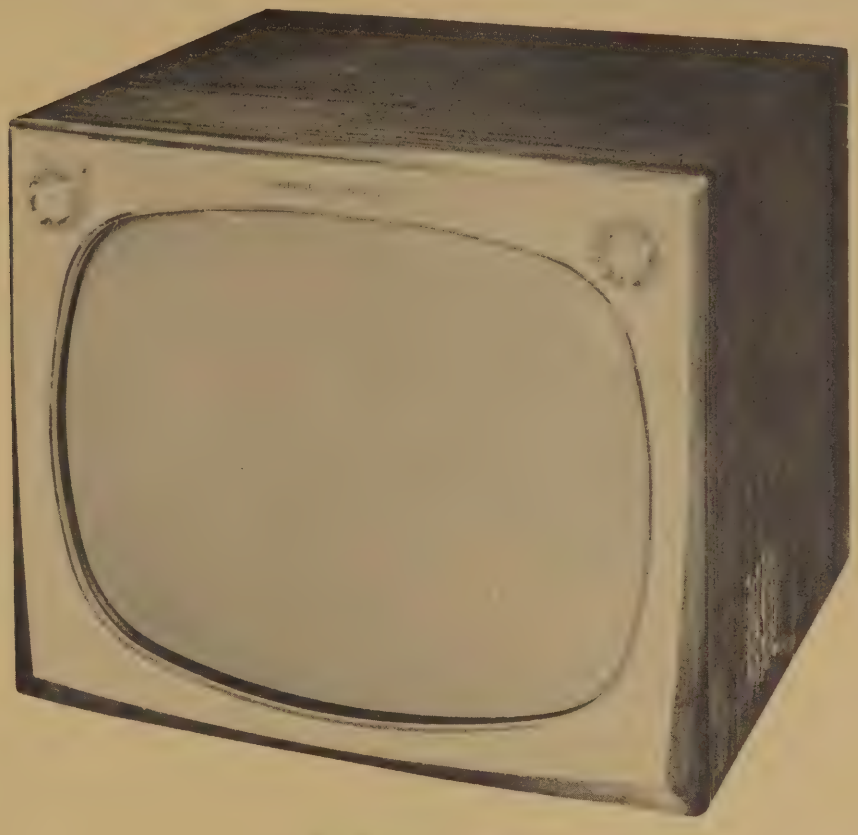

TRUETONE MODEL 2D2526A

TRADE NAME	Truetone Models 2D1520A, 2D1521A, 2D2526A, 2D2527A (Ch. 21T33), 2D1522A, 2D2528A (Ch. 21T31)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	105-115 Volts AC-60 Cycle RATING 1.88 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

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DATE 5-56 SET 316 FOLDER 15

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*TRADE MARK

TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

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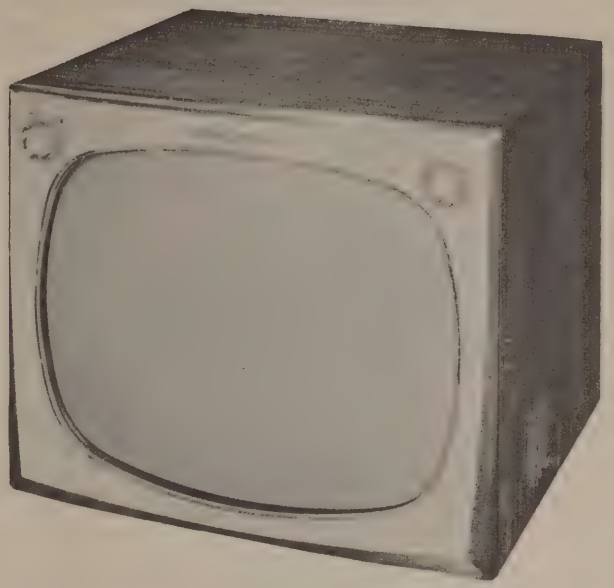
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 8 metal screws. Remove rear cover.
3. Remove 2 metal screws located behind channel selector and picture knobs.
4. Place receiver face down on a soft surface.
5. Remove 2 metal screws from interlock and antenna bracket.
6. Disconnect speaker leads, HV lead, picture tube socket and yoke plugs.
7. Remove 4 chassis bolts. Remove chassis.
8. Remove 2 speaker nuts. Remove speaker.



MODELS	CHASSIS
2D1520A, 2D1521A, 2D2526A, 2D2527A	21T33
2D1522A, 2D2528A	21T31

TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet below the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the tube side of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate the sound IF detector buzz, adjust the buzz control located on the tube side of the chassis for maximum and MINIMUM buzz.

HORIZONTAL SIZE CONTROL

The horizontal size control is a brass sleeve located on the neck of the picture tube and slides between the yoke and the picture tube. Push sleeve into yoke to decrease size, pull out to increase size.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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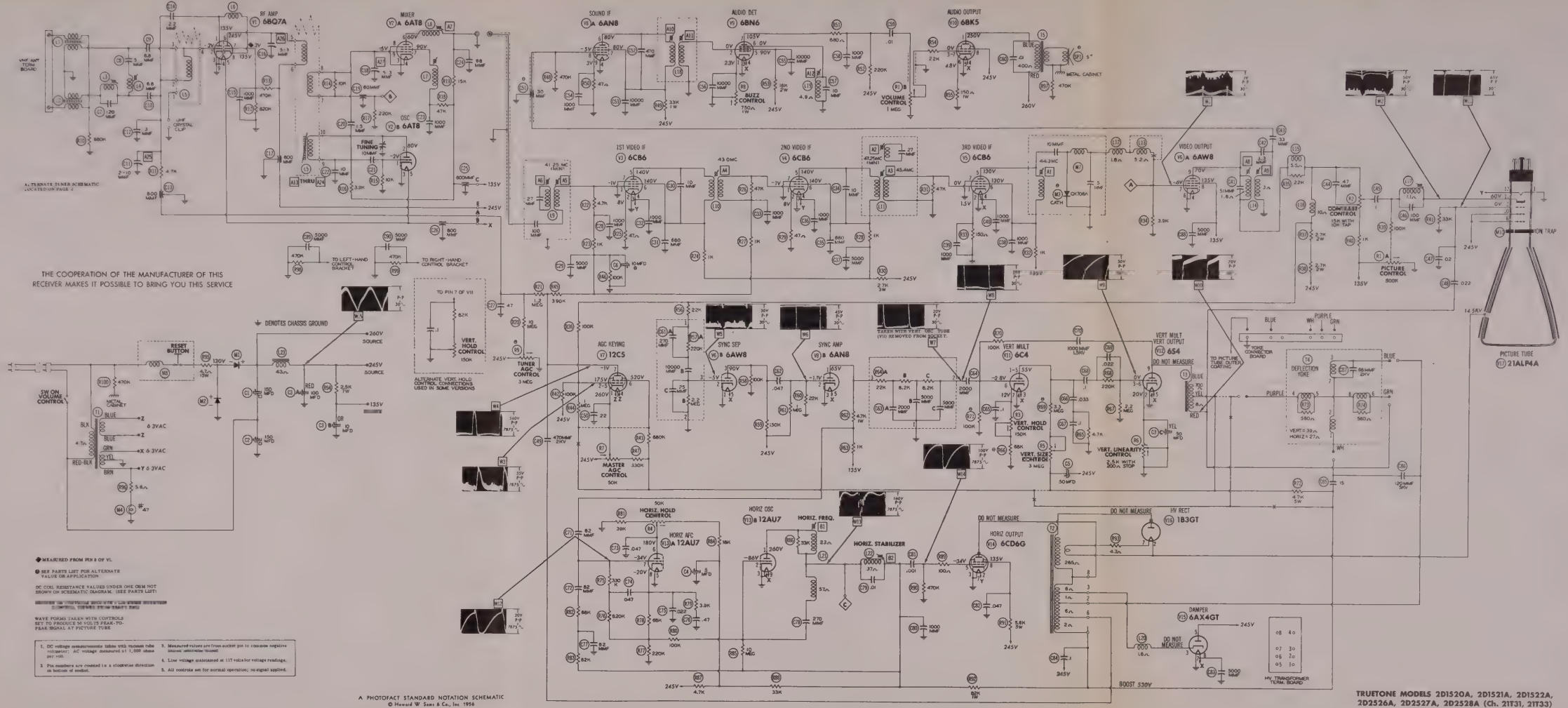
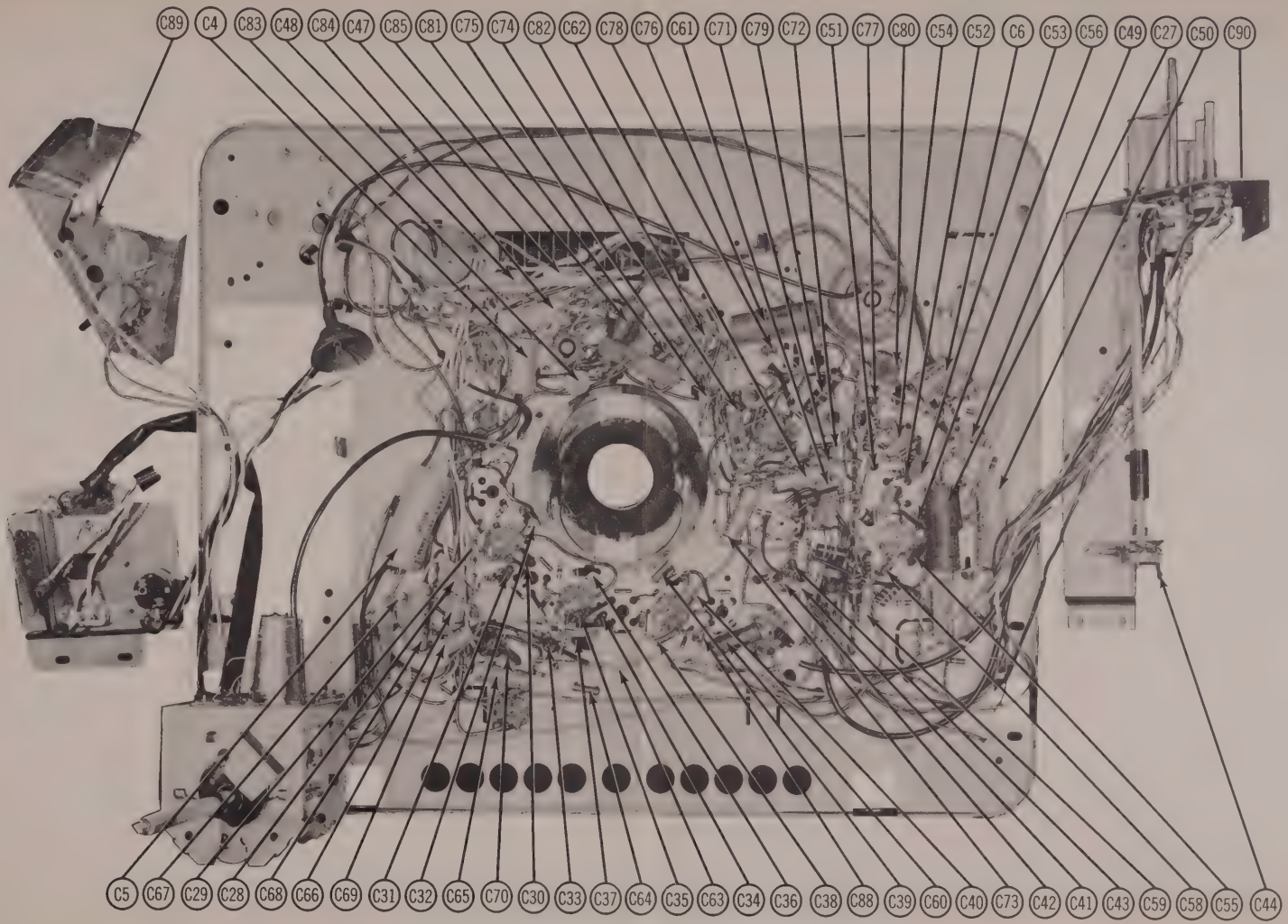
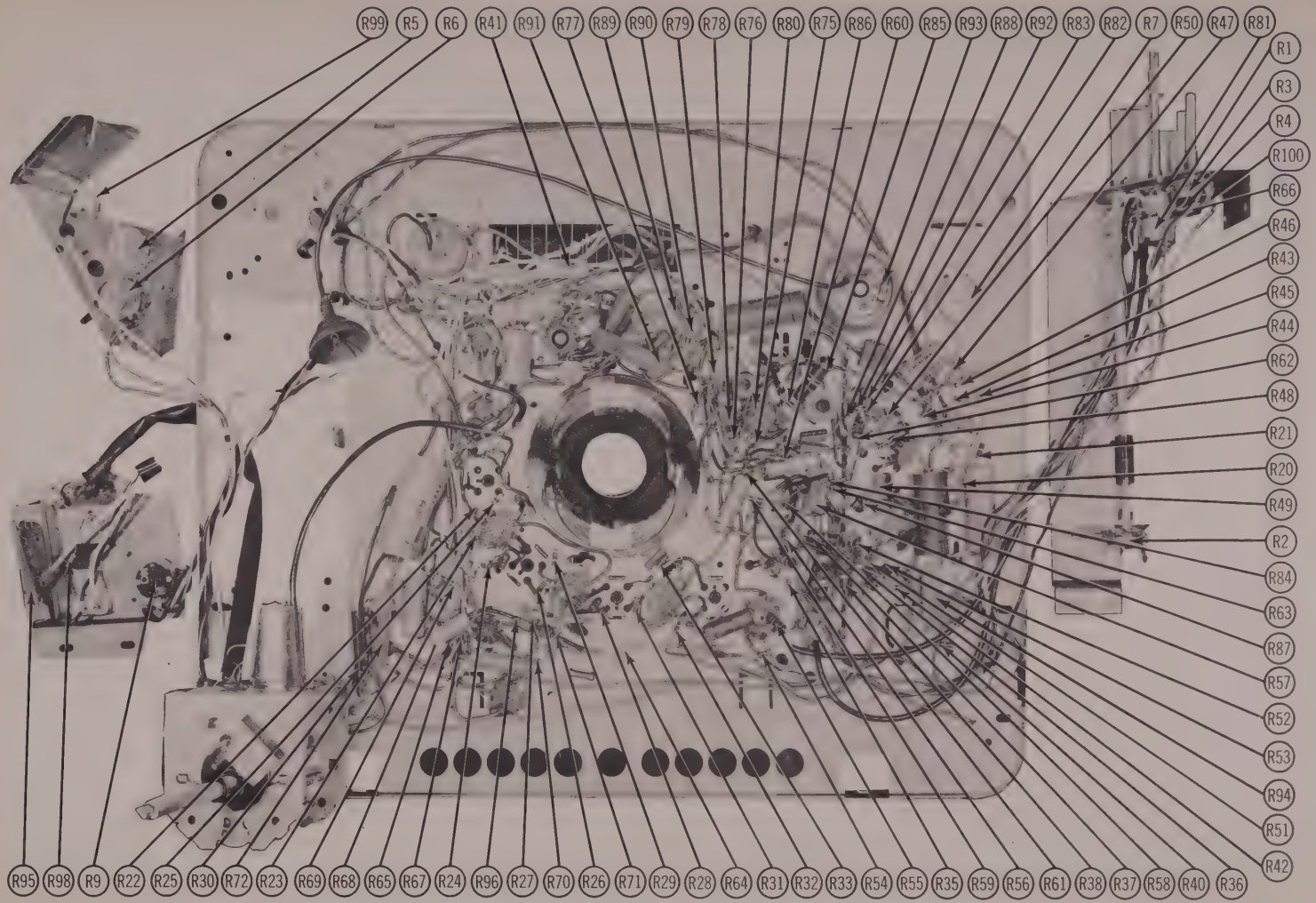
DATE 5-56 SET 316 FOLDER 15



TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

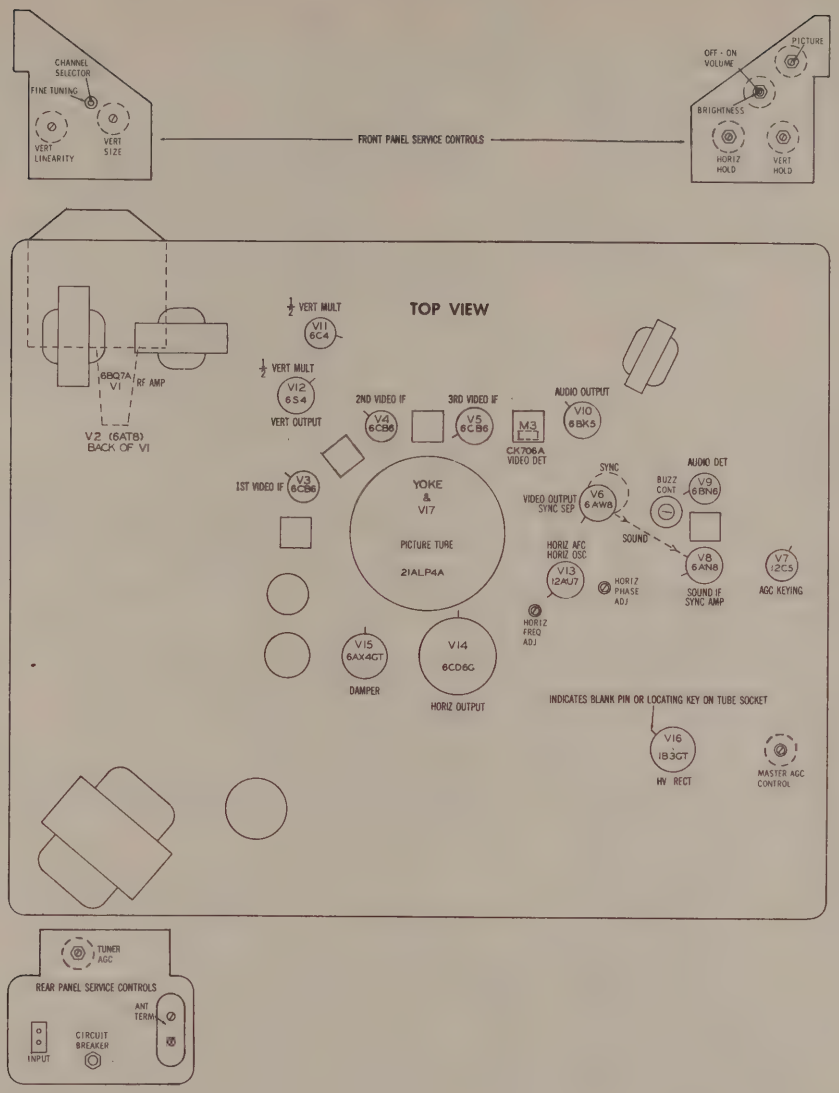


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2),** Circuit breaker (M6)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V17**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V8, V11, V12**
No horiz. sync - **V8, V13**
No vert. or horiz. sync - **V6, V8**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17**
No vertical deflection - **V11, V12**
Poor vert. linearity or foldover - **V11, V12**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, M1, M2**
Vert. off freq. - **V8, V11, V12**
Horiz. off freq. - **V8, V13**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped away from the chassis.

VIDEO IF ALIGNMENT

Connect a .001MFD capacitor across the vertical input terminals of the oscilloscope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	Not used	44.3MC (Unmod.)	10	Use VTVM DC probe to point Ⓐ. Common to chassis.	A1	Attenuate signal generator output to maintain not more than 2 volts at VTVM. Adjust for maximum deflection.
2.	"	"	"	47.25MC	"	"	A2	Adjust for MINIMUM deflection.
3.	"	"	"	45.4MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	"	43.0MC	"	"	A4	"
5.	"	"	43.5MC (10MC Swp.)	43.5MC 45.6MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Use only enough sweep generator output for useable pattern on scope. Check for response curve similar to Fig. 1. If necessary, retouch A1, A3, and A4 for desired response. Adjust A2 for MINIMUM tilt. A3 affects high frequency (45.6MC) side of response curve. A4 effects low frequency (43.5MC) side of curve.
6.	Direct	High side to an unground-ed tube shield floating over converter tube. Low side to chassis.	Not used	41.25MC	"	DC probe to point Ⓐ. Common to chassis.	A5	Adjust for MINIMUM deflection.
7.	"	"	43.5MC (10MC Swp.)	42.5MC 45.6MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A6, A7	Adjust A6 and A6 for response similar to Fig. 2. If necessary, SLIGHTLY retouch A1 for MINIMUM tilt, A3 for position of 45.6MC marker, and A4 for position of 43.5MC marker.

SOUND IF ALIGNMENT

Restore the receiver to normal operating condition. Tune in a TV station and adjust the fine tuning until sound bars just appear in the picture. Adjust A8 fully counter clockwise and then clockwise until the lines are smooth and continuous.
Readjust fine tuning for clearest picture and best sound.
Insert an attenuator in series with the antenna and the antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available, stray feed the signal to the receiver by placing the antenna lead-in near the antenna terminals of the receiver. Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 as evidenced by a hiss in the sound. Adjust the secondary of the sound take-off transformer (A9), the sound if transformer (A10 and A11), the quarature coil coil (A12) and the buss control (R8) for maximum sound and MINIMUM buss. If hiss disappears during alignment, increase attenuation until hiss reappears.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the Tuner AGC line. The channel oscillator adjustment screws are reached through a hole just below the channel selector shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should fall at 50%.
			207MC (10MC Swp.)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp.)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp.)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp.)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp.)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp.)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp.)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp.)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp.)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp.)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp.)	55.25MC 59.75MC	2		A24	

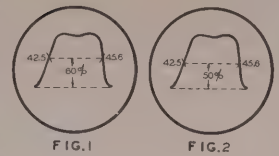


FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

VHF RF AND MIXER ALIGNMENT

Connect bias as under "VHF Oscillator Alignment."
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	199MC (10MC Swp.)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A35, A36, A37	Adjust for response curve similar to Fig. 4 with markers above 90%.
10.	"	"	213MC (10MC Swp.)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel, make compromise adjustments of A35, A36, and A37 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp.)	205.25MC 209.75MC	12			
			201MC (10MC Swp.)	199.25MC 203.75MC	11			
			195MC (10MC Swp.)	193.25MC 197.75MC	9			
			189MC (10MC Swp.)	187.25MC 191.75MC	8			
			183MC (10MC Swp.)	181.25MC 185.75MC	7			
			177MC (10MC Swp.)	175.25MC 179.75MC	6			
			85MC (10MC Swp.)	83.25MC 87.75MC	5			
			79MC (10MC Swp.)	77.25MC 81.75MC	4			
			69MC (10MC Swp.)	67.25MC 71.75MC	3			
			63MC (10MC Swp.)	61.25MC 65.75MC	2			
			57MC (10MC Swp.)	55.25MC 59.75MC				

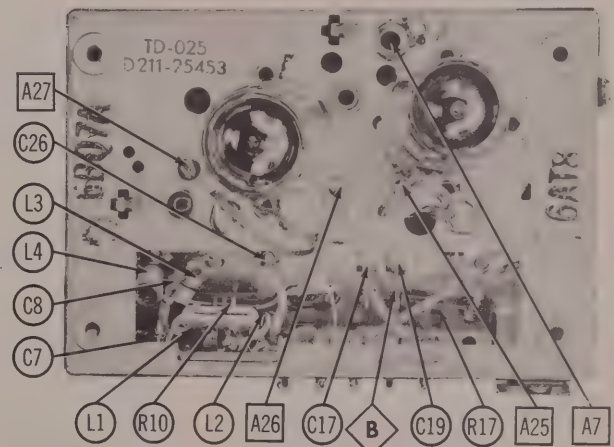
UHF TUNER ALIGNMENT

If sweep generator has no built-in marker, loosely couple a UHF marker generator to sweep generator output. Use low marker generator output.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	600MC		35	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A39	Attenuate generator output to maintain only enough signal to obtain desired response. Adjust A39 for response curve similar to Fig. 5.
12.	"	"	470MC		14	"		Response curve should have tilt similar to Fig. 6.
13.	"	"	870MC		80	"		Response curve tilt should be similar to Fig. 7. Tilts on response curves in step 12 and 13 should be approximately equal. If not, retouch A39 until they are.

40 TO 48MC INTERFERENCE TRAP ADJUSTMENT

If IF interference occurs, adjust A38 for MINIMUM interference in picture.

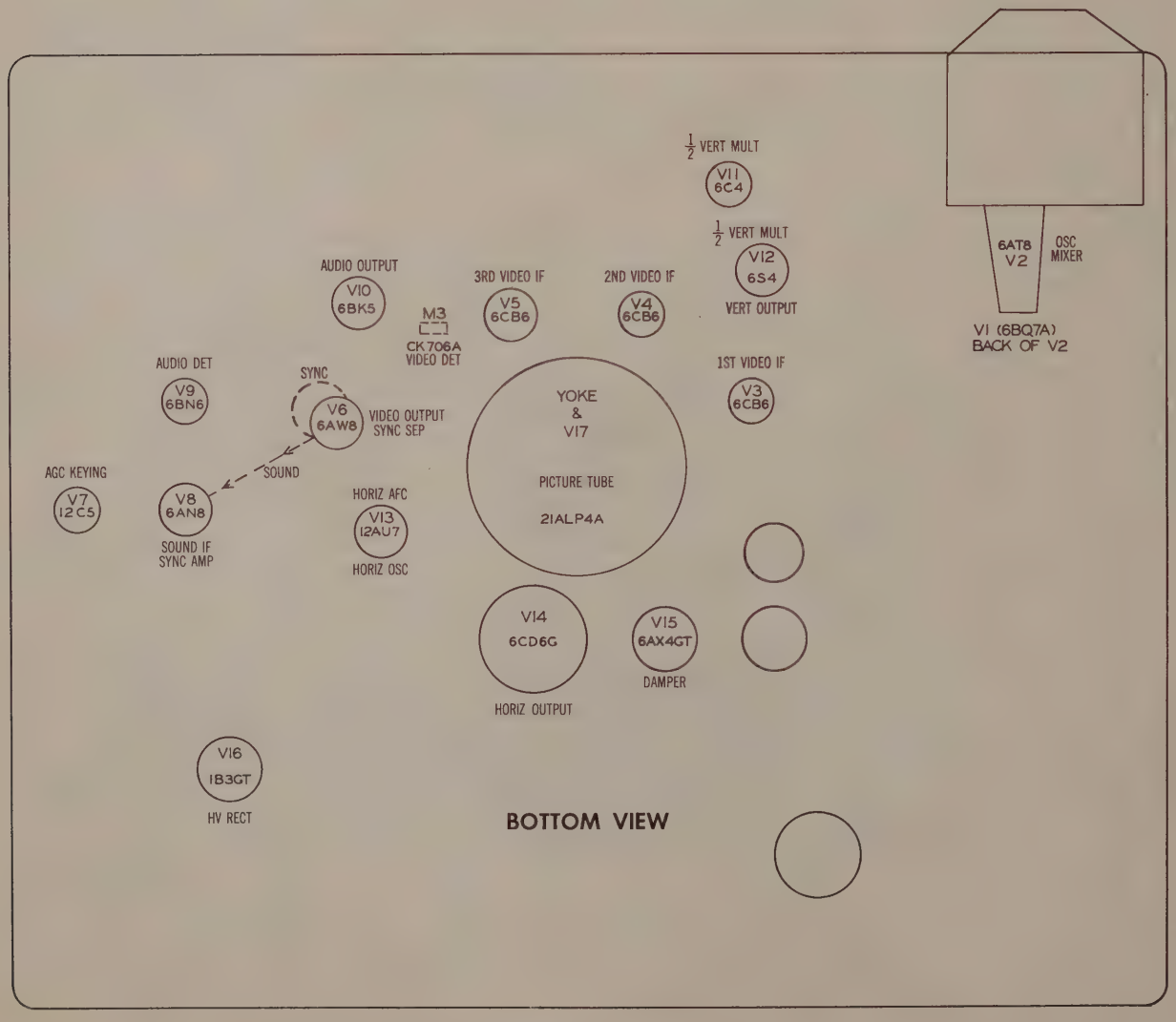


RF TUNER TOP VIEW

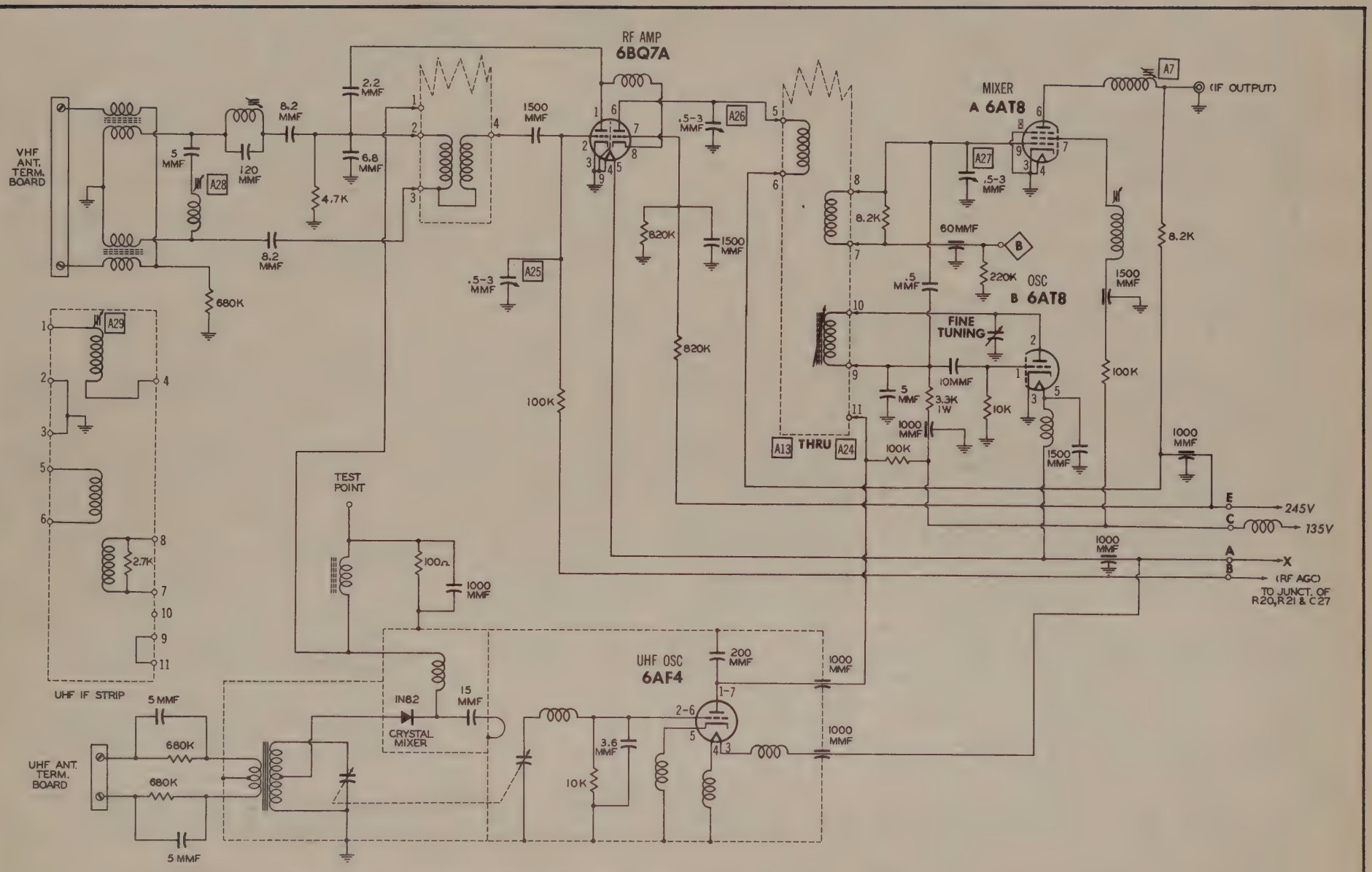
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1. 5Meg	0Ω	0Ω	. 1Ω	† 43Ω	300KΩ	INF	0Ω
V 2	6AT8	10KΩ	† 6. 4KΩ	0Ω	0Ω	. 1Ω	† 18KΩ	† 50KΩ	0Ω	220KΩ
V 3	6CB6	100KΩ	47Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 4	6CB6	100KΩ	47Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 5	6CB6	. 1Ω	150Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 6	6AW8	0Ω	2. 2Meg	† 70KΩ	0Ω	. 1Ω	0Ω	3. 9KΩ	† 2. 5KΩ	† 2. 5KΩ
V 7	12C5	† 22KΩ	† 40KΩ	INF	INF	† 40KΩ	▲ 600KΩ	500KΩ		
V 8	6AN8	† 8. 2KΩ	22KΩ	0Ω	0Ω	. 1Ω	† 33KΩ	† 33KΩ	470KΩ	47Ω
V 9	6BN6	250Ω	. 3Ω	0Ω	. 1Ω	† 18KΩ	4. 9Ω	† 220KΩ		
V 10	6BK5	† 400Ω	NC	150KΩ	. 1Ω	0Ω	150Ω	150KΩ	† 43Ω	TP
V 11	6C4	▲ 4Meg	NC	. 1Ω	0Ω	▲ 4Meg	100KΩ	100KΩ		
V 12	6S4	NC	800Ω	2. 2Meg	0Ω	. 1Ω	2. 2Meg	NC	NC	▲ 5. 4KΩ
V 13	12AU7	† 35KΩ	320KΩ	0Ω	0Ω	0Ω	† 25KΩ	1. 5Meg	300KΩ	. 1Ω
V 14	6CD6G	TP	. 1Ω	0Ω	TP	470KΩ	TP	0Ω	† 5. 6KΩ	TOP CAP ▲ 7. 5Ω
V 15	6AX4GT	TP	NC	80KΩ	NC	† 43Ω	TP	0Ω	. 1Ω	
V 16	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 270Ω
V 17	21ALP4A	0Ω	33KΩ	PIN 6 † 43Ω	PIN 10 † 43Ω	PIN 11 † 230KΩ	PIN 12 . 1Ω			

† MEASURED FROM OUTPUT OF M1.
▲ MEASURED FROM PIN 3 OF V15.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART



UHF-VHF TUNER PART NO. 211-25475 USED WITH CHASSIS 21T31

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE VHF-UHF TUNER SCHEMATIC

TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

DESCRIPTIONS (cont)

ELL-LIER No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
	GP2-333-202	UC-522	5HK-D2	
2P1		PT401	2TM-P1	
4P1		PT401	2TM-P1	
4P1		PT401	4TM-P1	
4S22	817-02	PT4122	2TM-S22	
1	IR5KV-102	DC3021	20GA-D1	
82	801-820		MS-482	
82	801-820		MS-482	
4S47		PT4147	4TM-S47	
2S47		PT4147	2TM-S47	
2S22	817-02	PT4122	2TM-S22	
2P47		PT4047	2TM-P47	
82	801-820		MS-482	
T27	811-271	MCE241	MS-327	
1	811-102	MCB255	MS-21	
6D1		PT621	6TM-D1	
4S47		PT4147	4TM-S47	
	811-005	DC-525	5HK-D5	
6P1		PT601	6TM-P1	
4P15		PT4015	2TM-P15	
18	3KV-680	DC30468	20GA-Q68	
	811-005	DC-525	5HK-D5	
	811-005	DC-525	5HK-D5	
	811-005	DC-525	5HK-D5	

e unit.
5

IRC ART No.	MALLORY PART No.	INSTALLATION NOTES
J-906	UF55L }	Picture (Panel)
	UR16A } †	Volume (Rear)
	US-26	Attach to R1B.
1-118X		Contrast Tapped at 10KΩ
t Req.		Attach to R2A.
-129	U-43	Vert. Hold
t Req.	Not Req.	Attach to R3A.
-123	U-35	Horiz. Hold
t Req.	Not Req.	Attach to R4A.
-140	U-59	Vert. Size
t Req.	Not Req.	Attach to R5A.
911-112	♦ TA352L	Vert. Linearity
t Req.	Not Req.	Attach to R6A.
-123	TA54L	Master AGC
	Not Req.	Attach to R7A.
		Buzz-Wire Wound
-140	U-59	Tuner AGC
t Req.	Not Req.	Attach to R9A.
-1	US-26	Attach to R9B-Note 1.

control and the lead connecting to the same
s down).

& P1-226 (Panel)
' & R2-310 (Rear)
switch)

M	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
	680Ω	½	9B1-60	BTS-680	
	220KΩ	½	9B1-90	BTS-220K	
	18KΩ	2	9B4-77	BTB-18K	
	22KΩ	½	9B1-78	BTS-22K	
	150Ω	1	9B2-52	BTA-150	
	22KΩ	½	9B1-78	BTS-22K	
A	220K		†17A-24212	BTS-220K	
B	2.2Meg			BTS-2.2Meg	
	100KΩ	½	9B1-86	BTS-100K	
	150KΩ	½	9B1-88	BTS-150K	
	22KΩ	½	9B1-78	BTS-22K	
	1Meg	½	9B1-98	BTS-1Meg	
	4700Ω	1	9B2-70	BTA-4700	
	1000Ω	½	9B1-62	BTS-1000	
A	22K			BTS-22K	
B	8200Ω		♦17A-22376	BTS-8200	
C	8200Ω			BTS-8200	
	4700Ω	½	9B1-70	BTS-4700	
	68KΩ	½	9B1-84	BTS-68K	Note 1
	2.2Meg	½	9B1-102	BTS-2.2Meg	
	220KΩ	½	9B1-90	BTS-220K	
	3.3Meg	½		BTS-3.3Meg	Note 2
	100KΩ	½	9B1-86	BTS-100K	
	100KΩ	½	9B1-86	BTS-100K	Note 3
	4700Ω	5	9C12-1107		
	560Ω	½	9B1-59		
	560Ω	½	9B1-59		
	330KΩ	½	9B1-92		
	820KΩ	½	9B1-97		
	220KΩ	½	9B1-90		
	68KΩ	½	9B1-84		
	3900Ω	½	9B1-69		
	100KΩ	½	9B1-86		
	39KΩ	½	9B1-81		
	68KΩ	½	9B1-84		
	82KΩ	½	9B1-85	BTS-82K	
	18KΩ	½	9B1-77		
	10Meg	½	9B1-110		
	33KΩ	½	9B1-80		
	4700Ω	½	9B1-17	BTS-4700	
	33KΩ	½	9B1-80	BTS-33K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R89	100Ω	½	9B1-50		
R90	470KΩ	½	9B1-94		
R91	5600Ω	5	9C12-1108		
R92	82KΩ	1	9B2-85	BTA-82K	
R93	4.7Ω	½	9C1-1071	BW½-4.7	
R94	2500Ω	7	9C-24033	PW7-2500	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R95	4.7Ω	15	9C-25668		
R96	5.6Ω	½	9C1-1072	BW½-5.6	
R97	470KΩ	½	9B1-29	BTS-470K	
R98	470KΩ	½	9B1-29	BTS-470K	
R99	470KΩ	½	9B1-29	BTS-470K	
R100	470KΩ	½	9B1-29	BTS-470K	

Note 1. Some versions use a 82KΩ ½W resistor in this application (Mfgr. Part No. 9B1-85).
Note 2. Some versions use a 3.9Meg ½W resistor in this application (Mfgr. Part No. 9B1-105).
Note 3. Some versions use a 47KΩ ½W resistor in this application (Mfgr. Part No. 9B1-82).
† Items R57A, R57B, C61A, C61B, C61C are combined in one unit.
♦ Items R64A, R64B, R64C, C63A, C63B, C63C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⓐ .73A	12.6VCT ⓐ 4.6A	12V ⓐ .6A		12D-25564					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	12E-25424	FB448 *	HV0-58 *		X126 *		FLY-80 *	D-83 *
T3	Vert. Output Trans.	12E-19048-2	Z1900 ①②	A-3038 ①	222T1 ③	V305 ①	A-8143 ①	26S53 ①	A-99X ①
T4A	Yoke (90°) Horiz. (18.5MH)	201-25360	DF607 ⑤ ⑥⑦	MDF-92 ⑤ ⑥ ⑧	236D1 ⑤ ⑧ ⑦	Y90F19/43 ⑤ ⑥ ⑦	DY-16A ⑤ ⑥ ⑧	Y-16 ⑤ ⑧ ⑦	Y-41-1 ⑤ ⑥ ⑧
B	Vert. (39MH)	16M-23770 ④							

① Connect as auto transformer.
② Use 10 to 1 turns ratio.
③ Drill new mounting hole(s).
④ Yoke rear cover and centering device.
⑤ Use original rear cover and centering device.
⑥ Loosen and rotate core clamp to duplicate original mounting.
⑦ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.
⑧ Use original horizontal damping network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	8	8	8		8		8	8
	3	3	6		6		6	3
	2	3	6		6		6	3
	6	6	See Note ⑨ 3		See Note ⑨ 3		See Note ⑨ 3	6
	1	2	2		2		2	2
Special Notes →			⑨		⑨		⑨	

⑨ Change AGC coupling capacitor C49 to approximately 30 to 70MMF ⓐ 3KV.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	6.5KΩ	3-4Ω	12C-24170	Z1004	A2931	A3878	24S52	S-51X	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA TRUETONE PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	5"	PM	3-4Ω	18A24682 ①	5A07	205S2	① Used in Models 2D2526A, 2D2527A, 2D2528A.
	6"x 9"	PM	3-4Ω	18A25498 ②	69A2	238S1	② Used in Models 2D1520A, 2D1521A, 2D1522A.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L2	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L3	IF Trap	.2Ω		31T-417				
L4	FM Trap	0Ω		31T-418-01				
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-32-D				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-33-D				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-34-D				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-35-D				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-36-D				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-37-D				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-38-D				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-39-D				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-40-D				Channel 10

TRUETONE MODELS 2D1520A, 2D1521A, 2D1522A, 2D2526A, 2D2527A, 2D2528A (Ch. 21T31, 21T33)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-41-D				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-42-D				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-43D				Channel 13
L6	Neut. Coil	0Ω		31B-727				
L7	RF Coil	0Ω		25A-154-01				
L8	Conv. Plate			31UA-505				
L9	1st Video IF			13A-24203				Includes 41.25MC Trap & Cap.
L10	2nd Video IF	.1Ω	.1Ω	13A-24224	17-5001 *	TV-125 *	6231 *	
L11	3rd Video IF	.1Ω	.1Ω	13A-24937	17-5003 *	TV-128 *	6233 *	Includes 47.25MC Trap
L12	Series Peaking Coil	1.8Ω		16A-22427				7.5 Microhenries
L13	Shunt Peaking Coil	5.2Ω		16A-24998				140 Microhenries-Note 1
L14A	4.5MC Trap	1.8Ω		201-23729				
B	1st Sound IF	3Ω						
L15	Series Peaking Coil	5.5Ω		16A-24020	19-3180	TV-184	6180	170 Microhenries
L16	Shunt Peaking Coil	10Ω		16A-24019	19-3500		6138	480 Microhenries
L17	4.5MC Trap	1.1Ω		16A-25441	20-1004	TV-151	1469	
L18	2nd Sound IF	.3Ω	.3Ω	201-23873				
L19	Quadrature Coil	4.9Ω		201-23727			1480	
L20	RF Choke	1.6Ω		16A-21701	19-1005		4612	8 Microhenries

Note 1. Not used in some versions.
* Cut out chassis hole and use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L21	80Ω		12E-24440			6212				Horiz. Osc. - tapped @ 57Ω
L22	37Ω		13M-24441			6314				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L23	.350A	43Ω	1.34HY	16B-25146	C5041 ①		C2328 ①		

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA TRUETONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.380A	21J-25315	1179D	RS400	6S450	5S2	500	
M2	.380A	21J-25315	1179D	RS400	6S450	5S2	500	

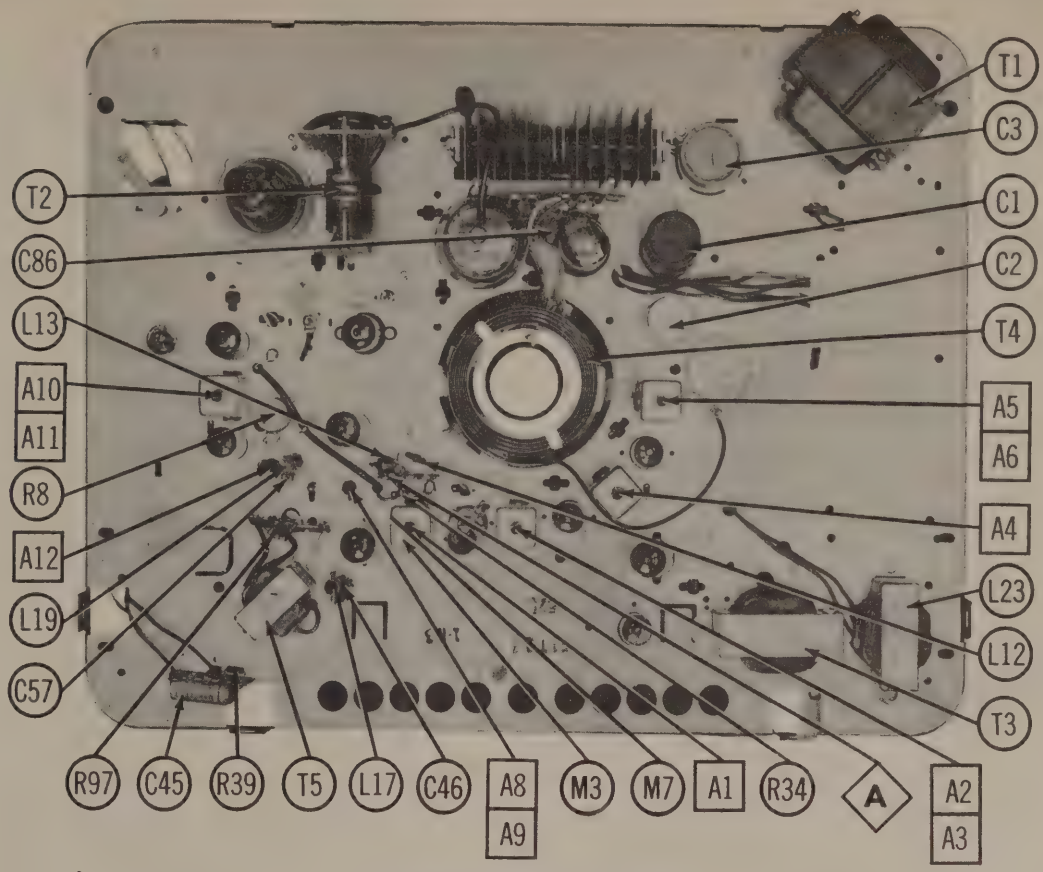
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M3	CK-706A*	8M-21959	1N60	Video Det. (Pigtail)

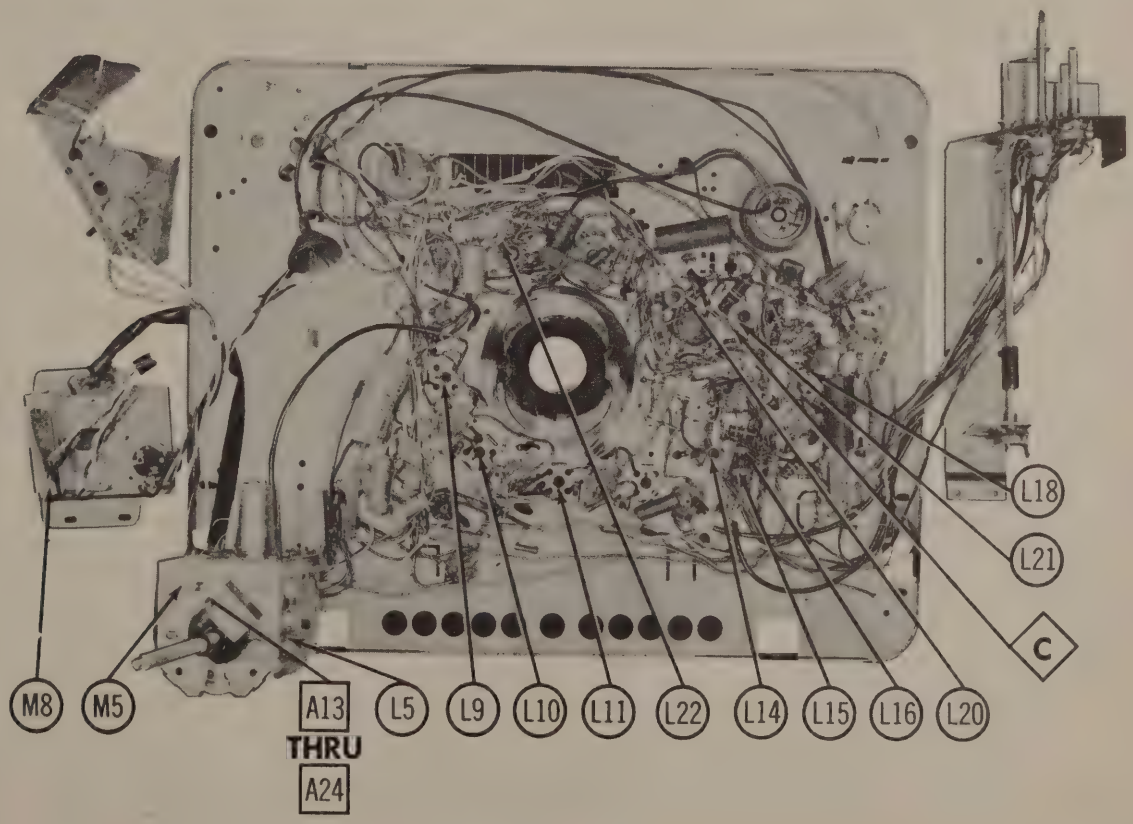
* Some versions may use crystal diode type CK-706 in this application.

MISCELLANEOUS

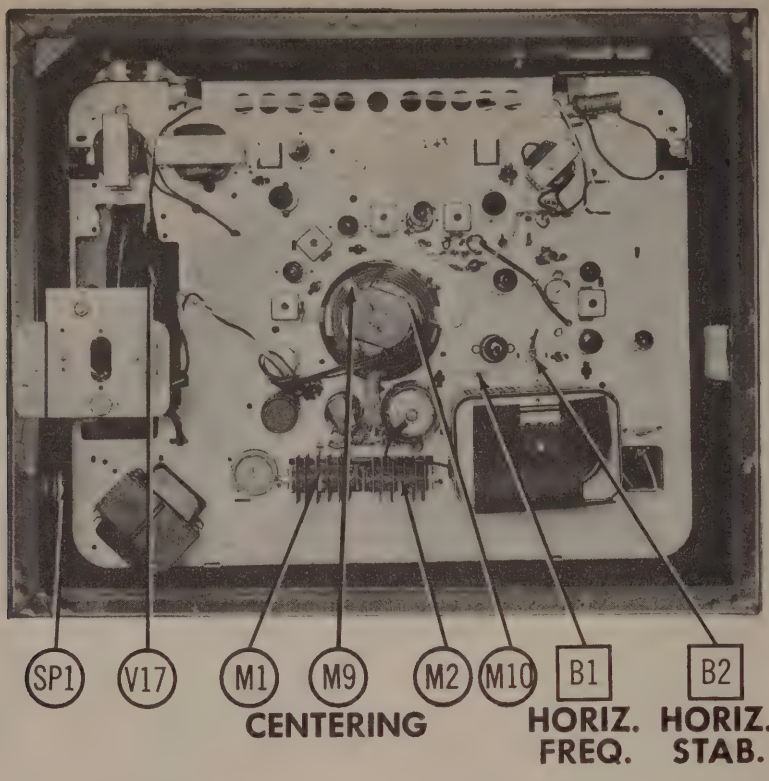
ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Dial Light	46A-10793	#47
M5	Tuner	21I-25453	VHF-Chassis 21T33
M6	Tuner	21I-25475	VHF-UHF-Chassis 21T31
M7	Video Det. Assy.	13B-24206-1	Includes M3, Coils, & Capacitors
M8	Circuit Breaker	20F-25568	
M9	Centering Device	16M-23770	Includes Deflection Yoke (T4) Rear Cover
M10	Ion Trap	16M-19705	
	Cabinet	200-25490	Models 2D-1522A, 2D-1520A
	Cabinet	200-25381-1	Model 2D-2527A
	Cabinet	200-25381	Models 2D-2528A, 2D-2526A
	Cabinet	200-25490-1	Model 2D-1521A
	Knob	5B-25494-A56	Channel Selector-Models 2D-1522A, 2D-2528A
	Knob	5B-25184-A56	Channel Selector-Models 2D-1520A, 2D-1521A, 2D-2526A, 2D-2527A
	Knob	5B-25495-A29	Fine Tuning-Models 2D-1522A, 2D-2528A
	Knob	5B-25177-A29	Fine Tuning-Models 2D-1520A, 2D-1521A, 2D-2526A, 2D-2527A
	Knob	5B-25734-A56	UHF Indicator-Models 2D-1522A, 2D-2528A
	Knob	5B-25183-A56	On-off-volume
	Knob	5B-25178-A29	Picture
	Knob	5B-25176-A29	Control (3 Used)
	Safety Glass	30M-25492	



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Turn the horizontal hold control (R4) to its mid-range position.

Connect a short clip lead across L22. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. Remove the clip lead from across L22. Connect the vertical amplifier of the oscilloscope thru a low capacity probe to point Ⓒ. Low side to chassis.

Adjust the horizontal stabilizer coil slug (B2) until waveform similar to Fig. 8 is obtained. While making this adjustment keep the picture in sync with the horizontal hold control. Remove scope connections. Check range of the horizontal hold control (R4). Turn R4 fully counter clockwise and then fully clockwise. The picture should fall out of sync at each extreme setting of R4.

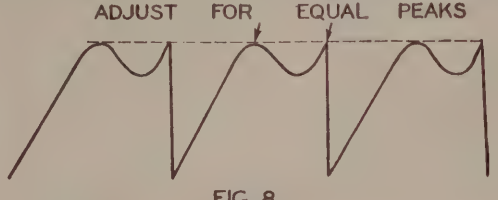
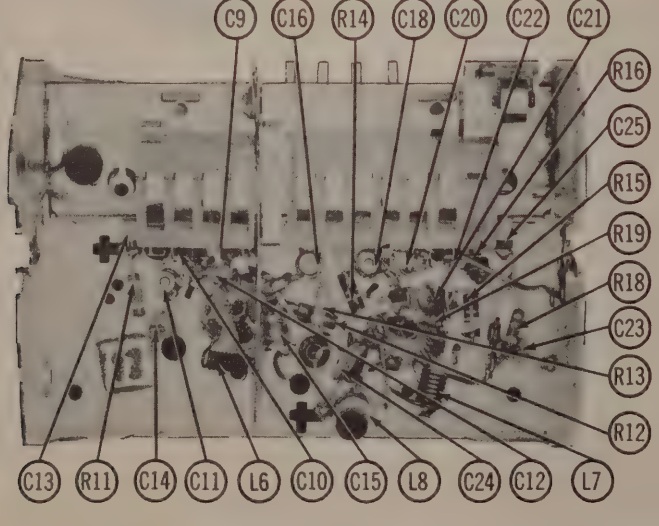


FIG. 8



RF TUNER BOTTOM VIEW

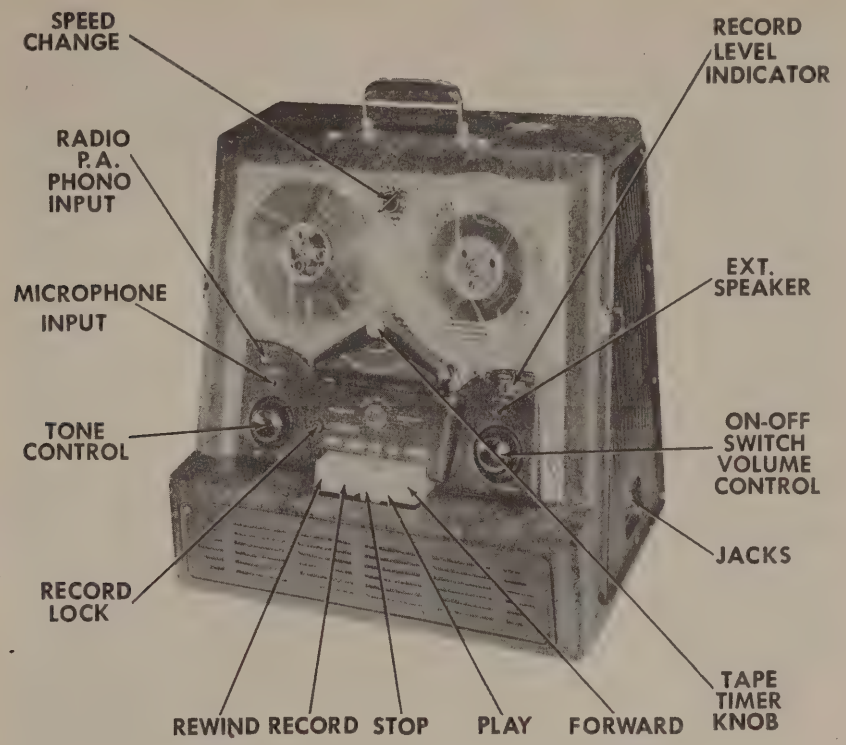


Figure 1

GENERAL INFORMATION

The Wilcox-Gay "Recordio" 5U Series "Imperial" Model features fingertip operation for Fast Forward, Playback, Stop, Record, and Fast Reverse. A "Tape Timer" enables you to locate immediately and exactly any selection on a recorded tape. This recorder is designed to record and playback two tracks of material on standard width recording tape. Any reel size up to 7" can be used. Two neon recording indicators simplify the recording level setting. New recordings can be made on previously recorded tape since the erase head is automatically positioned when the "Record" button is pressed, or the same recording may be played back indefinitely. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone.

The Model 5U has two large high-quality speakers and full frequency response is assured by the addition of two high frequency electrostatic "tweeter" speakers. Three jacks are provided for the use of external speakers when greater volume and better coverage are needed.

The Model 5U has two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape the recording time is as follows:

SIZE	3 3/4"SPEED	7 1/2"SPEED
5"reel (600 ft.)	1 hour	1/2 hour
7"reel (1200 ft.)	2 hours	1 hour

This unit is designed to operate on 60 cycle, 115 volts, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

Manufactured by:
Wilcox - Gay Corporation
Charlotte, Mich.

PROPERTY OF
L. F. BLANKENSHIP
3924 IRENE ST.
DENVER, COLORADO

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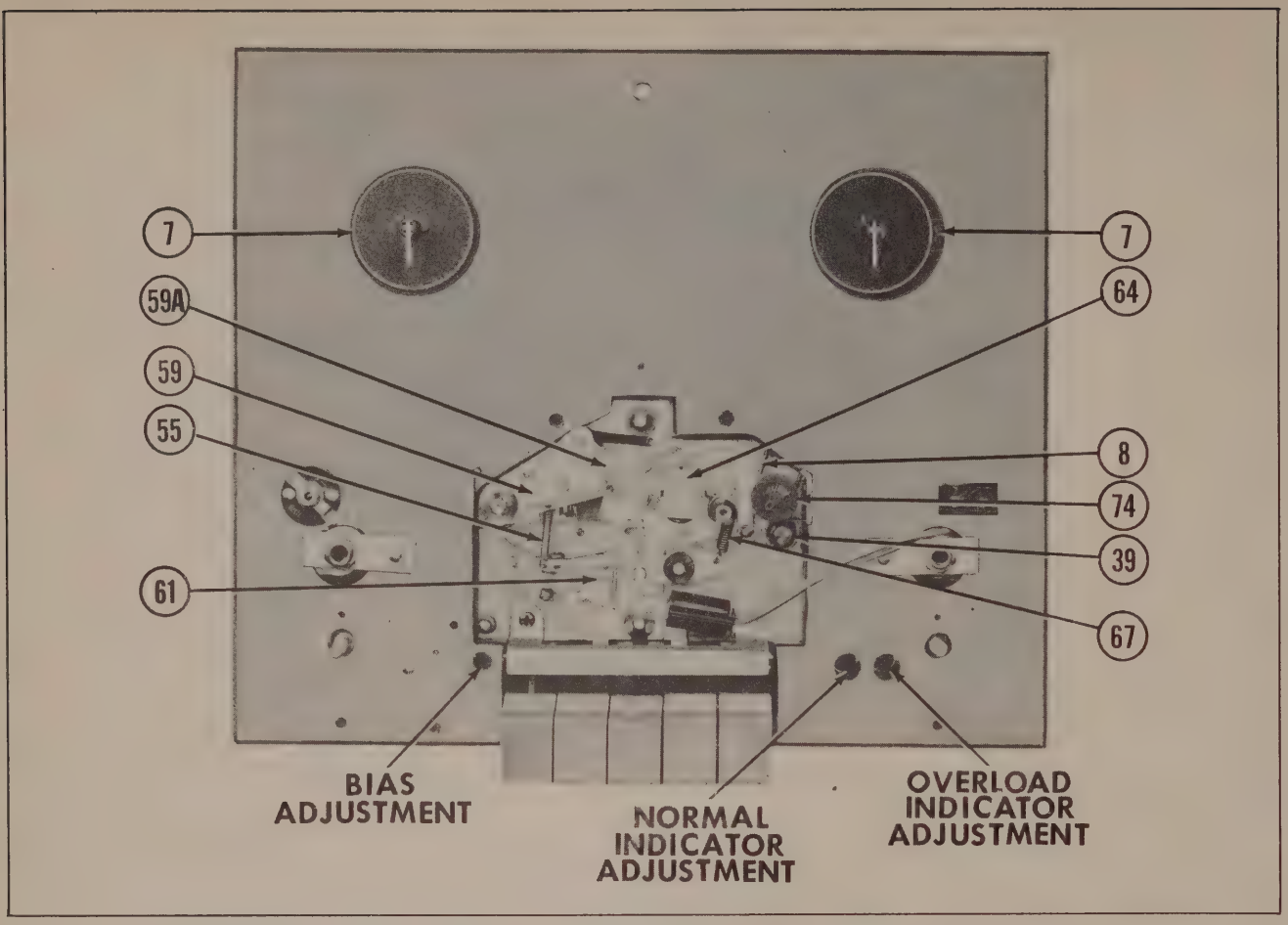


Figure 2

OPERATING INSTRUCTIONS

Preparation For Operation-

1. Remove the AC power cord, 7" reel of tape, empty reel and the microphone from the rear storage compartment.

2. Depress the "Stop" button.

3. Plug the AC cord into a convenient wall receptacle of the proper rating.

4. Set speed change knob to 7.50 or 3.75 as desired.

5. Place Remote-Normal switch in "Normal" position.

CAUTION: Do not turn speed change knob unless "Stop" button is depressed.

When the Forward or Reverse buttons are depressed, the Record and Play buttons are locked so that they cannot be pressed down, with the possibility of spilling tape. The buttons should always be pressed down firmly until they latch and the Stop button must be depressed before changing functions or speeds of the recorder.

IMPORTANT: Always depress the Stop button when the machine is not in use.

Speed Change Knob-

The arrow on the speed change knob should point at 7.50 or 3.75 according to the speed desired. This recorder has two speeds, 7 1/2" and 3 3/4" per second. The arrow pointing at 7.50 means the unit will operate at the fast speed or 7 1/2" per second.

CAUTION: Turning the speed change knob while the unit is operating will not change the speed. The Stop button must be depressed before the speed can be changed.

Threading The Tape-

1. Place a full reel of tape on the left (supply) spindle, making certain one of the reel slots catch the protrusions of the pan. Unwind about 14" of tape from the supply reel.

2. Insert free section of tape into the tape slot.

3. Insert free end of tape into one of the three slots in the hub of the right (take-up) reel and while holding the tape in place give the reel two or three turns until the tape is secured.

4. The dull side of the tape should always face away from the operator (rear of unit).

To Record From Microphone-

1. Turn the On-Off Volume control to the right until a click is heard and allow about 30 seconds for

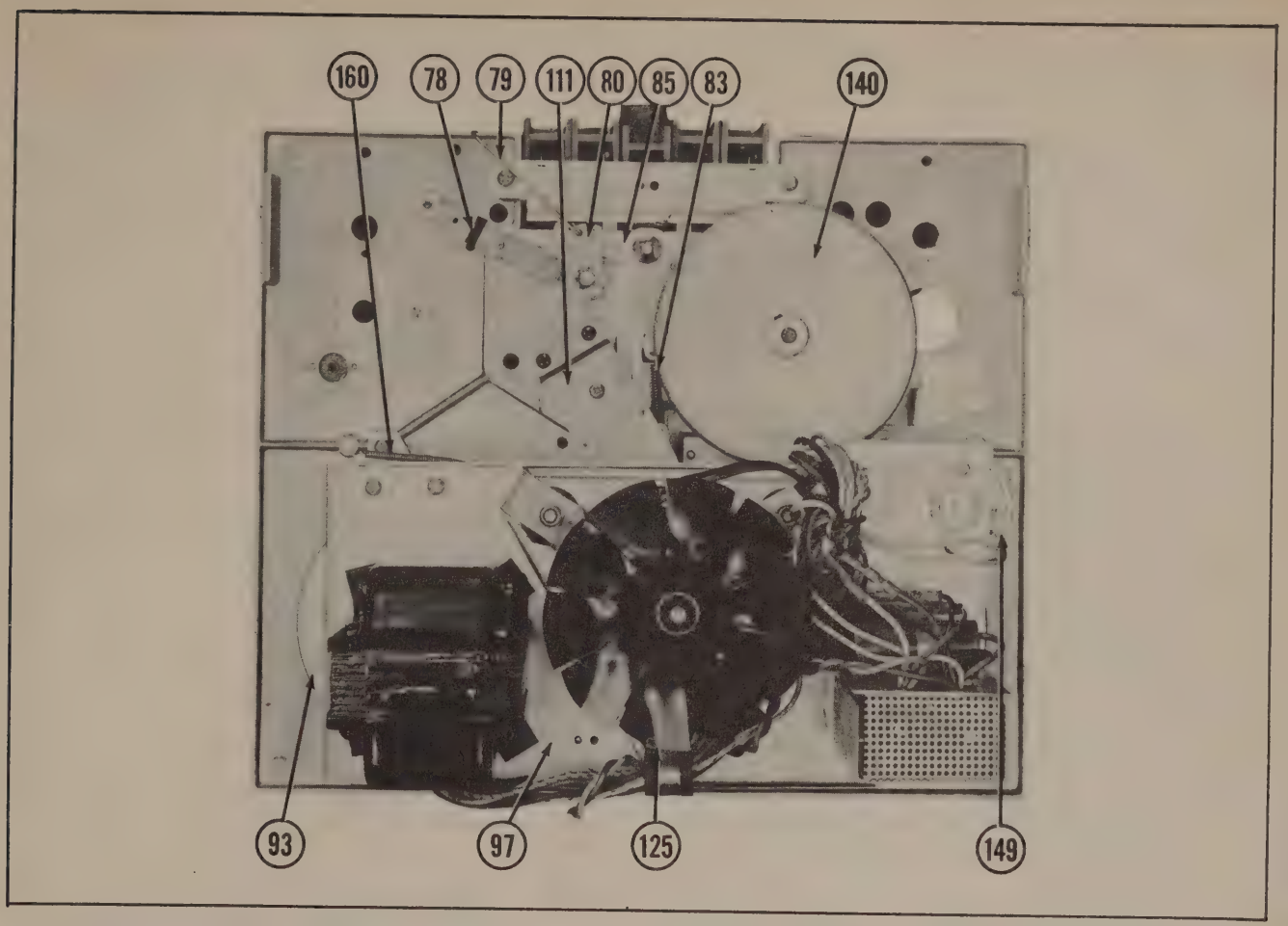


Figure 3

the unit to warm up. The pilot light located above the Stop button will glow when the unit is turned on.

2. Insert the microphone plug into the "Microphone" input.

3. Move the record lock button (21) downward with the left hand. This releases the safety lock which prevents accidental erasure.

4. Depress the "Record" button with the right hand (while holding record lock button (21) with the left hand) until it latches.

5. Adjust the "Volume" control until the "Normal" indicator just flashes, while speaking into the microphone. When the "Volume" control is advanced too far the "Overload" indicator will flash and the recording will be distorted. To prevent overload, lower the "Volume" control to a point where the "Overload" indicator will not flash.

6. The "Tone" control does not operate during recording. When recording from radio, set the radio "Tone" control for maximum treble.

To Record From External Radio, TV, Or Phonograph-

1. Insert the phonograph pickup plug into the "Radio-P. A. -Phono" jack.

2. For radio or TV recording, connect patch cord, part No. C20. 233 to the voice coil of the radio or TV receiver speaker by means of the alligator clips. Plug into "Radio-P. A. -Phono" jack.

3. Proceed as described under "To Record From Microphone".

NOTE: Remove patch cord after recording is completed.

To Use Second Track-

1. Depress the "Stop" button when all the tape has wound onto the take-up reel.

2. Remove reel containing tape and place on left-hand supply pan.

3. Place empty reel on right-hand take-up pan.

4. Thread tape as previously described.

To Play Recordings-

1. Turn on unit with "Volume" control knob.

2. Thread tape as described under "Threading The Tape."

3. Set the speed change knob (1) to the speed at which the recording was made.

4. Depress "Play" button until it latches.

5. Adjust "Volume" and "Tone" controls to desired listening level.

High-Speed Forward Or Reverse-

When it is desirable to play a certain portion of the tape over again it is not necessary to rewind the entire tape. By depressing the 'Forward' or 'Reverse' button the tape will advance (or reverse) at a rapid speed.

Several minutes of normal recording can be skipped in a few seconds by the "Reverse" and "Forward" buttons.

Tape Timer-

If, when making recordings or playing a recorded tape, you wish to play back a certain recording, note the reading on the timer scale when the particular recording is being made or heard. Rewind the tape until the number you have noted appears on the scale, press "Stop" button, then press "Play" button and you are now listening to the recording you wanted.

When starting a new reel of tape or re-recording a reel, reset the indicator pointer to "O" by rotating the reset knob. By starting at "O" on all tapes, the number location can be cataloged for each selection on any reel.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

Erasing Recorded Material-

When the record button is depressed, the erase head is automatically positioned, erasing any previous recording before a new one is made. You may erase material no longer needed, without recording, by depressing the "Record" button and turning the "Volume" control knob to the minimum volume position or extreme counter-clockwise position just before the recorder shuts off. One track is erased at a time. To erase the second track, reverse the reels and repeat the above operation.

To Use Recorder As A Public Address System-

The Model 5U, with its own speakers, can be used as a public address system by depressing the "Stop" button and pressing the Microphone switch. Set Tone and Volume to the desired level. A recording can be made at the same time by depressing the "Record" button.

CAUTION: When using the public address feature, see that the microphone is as far away from the speakers as possible, to prevent "feedback" squeal.

Remote Control Operation-

The "Instant Stop Start" remote control unit supplied with your "Recordio" plugs into a five pin socket located on the left hand side of the "Recordio" (Fig. 1). It enables the tape to be stopped or started at any time during Record or Play from a distance of up to fifteen feet. Pressing the remote control switch once will stop the tape instantly; pressing the switch again will restart the tape at the identical spot at which you stopped it.

ADJUSTMENTS

Disassembly Instruction-

1. Remove push-on type "Volume" and "Tone" control knobs.

2. Remove two Phillips head screws located under knobs.

3. Remove seven Phillips head wood screws from around front panel.

4. Remove two hex. head screws located under front escutcheon (22).

5. Open back panel and remove leads from 5 x 7" oval speaker.

6. Remove electrostatic speaker plug.

7. Remove complete unit by pulling out front of case; the remaining leads are long enough to permit complete removal of unit from case.

NOTE: The tubes may be serviced without removing unit from case by removing grille at rear of case.

Record-Play Head Adjustment-
(See Exploded View)

To adjust the record-play head (64) for maximum frequency response, make the following adjustment:

1. Remove the rear escutcheon (16) and rear escutcheon plate (20).

2. Properly thread an alignment tape or a good recorded tape on the machine.

3. Set the controls as described under "To Play Recordings".

4. With the unit playing turn head adjustment screw (64A) right or left until maximum high frequencies are obtained.

Pressure Pad Adjustment-
(See Exploded View)-

1. Remove the front escutcheon (22).

2. Depress the "Play" button. Do not turn the recorder on.

3. Use a pencil type postal scale and check the amount of pressure necessary to just pull the pad away from the tape. The test should be made on the end of the pressure pad for 1 3/4 oz. $\pm$1/4oz. pressure.

(a)The record head pressure pad is adjusted by the locked adjustment screw (61).

(b)The guide post pressure pad (56) is adjusted by bending the pressure pad spring. It must be ad-

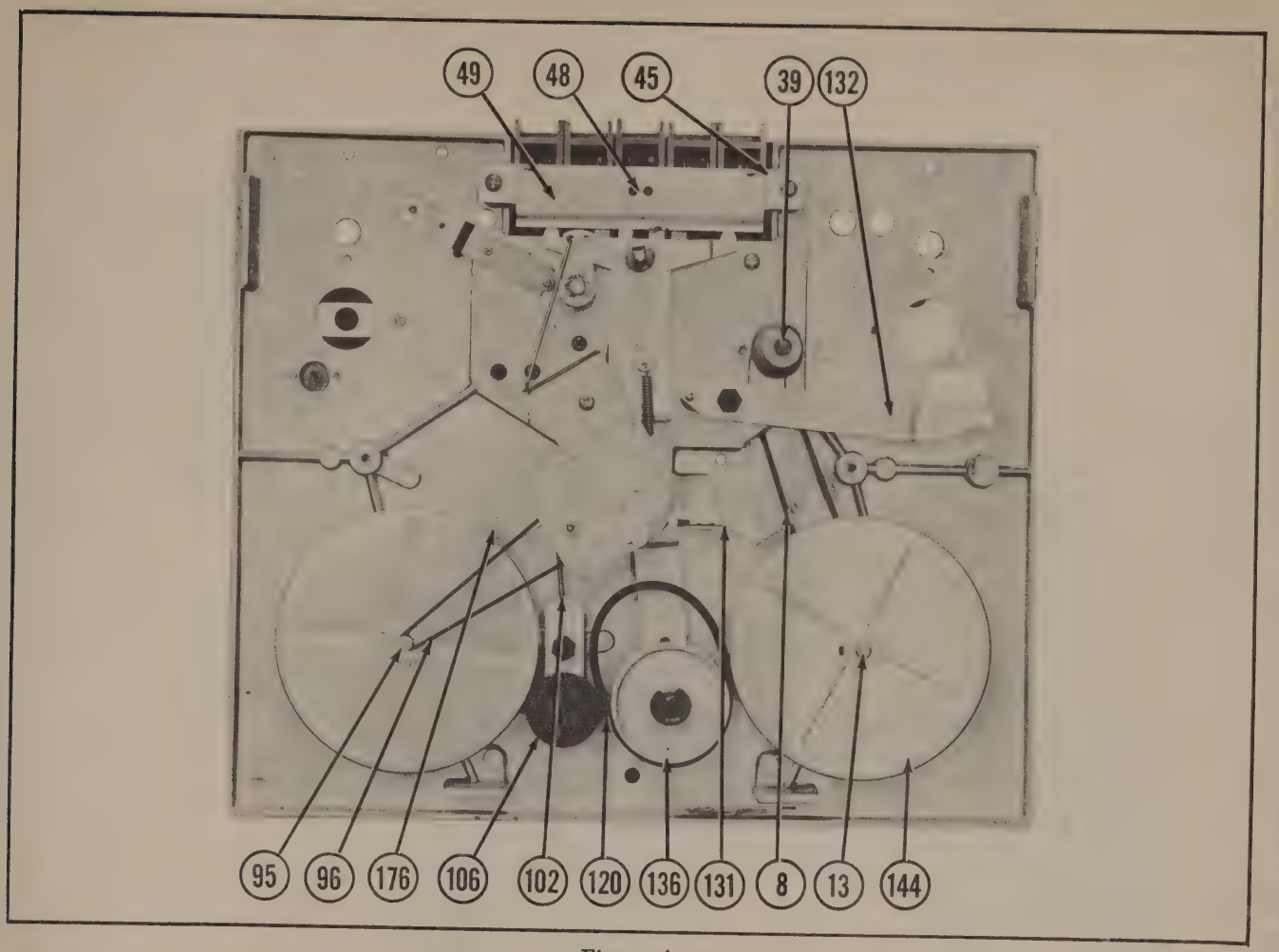


Figure 4

justed for minimum pressure against the tape.

4. After the adjustments are made depress the "Stop" button and replace the front escutcheon.

Erase Head Adjustment-

1. With the escutcheons removed check the erase head (59) to see if it is parallel with tape.

2. Check to see if the top edge of the tape coincides with the top end of the diagonal slot in the erase head (junction of long diagonal slot and short vertical slot). To adjust level of tape, loosen set screw (50), see exploded view, and rotate tape guide post (51) to move tape up or down. Tighten set screw (50).

3. After this adjustment has been made, check to see if the tape moves forward approximately 1/64"when the "Record" button is depressed. If not, loosen the forward adjustment screw (59A), see Figure 2, and turn the screw in or out as required to obtain this 1/64" movement. Tighten the lock nut.

Brake Shoe Adjustment-

1. In order to adjust the brake shoes, the complete mechanism must be removed from the carrying case and the speakers disconnected.

2. With all push buttons in the up position the brake shoes on the brake spring (131) should clear the drums by approximately 1/8".

3. Depress the "Stop" button while observing the brake shoes. Both brake shoes must contact the drums at the same time and with equal pressure.

4. The adjustment is accomplished by bending the spring arm (131).

Hum Control Adjustments-

The dual hum control is preset at the factory. However, if any of the tubes are replaced these controls should be reset for minimum hum. If the 5879 only is changed, set the Recordio to "Play", turn the "Volume" control to maximum (clockwise) and adjust the outer shaft of hum control for minimum audible hum. If other tubes are changed, set recorder to "Record", plug a speaker into the 600 ohm jack and turn "Volume" control to maximum, adjust inner shaft of hum control with a small screw driver for minimum hum, then set recorder to "Play" and repeat for outer shaft adjustment.

Adjustment For Slow Take-Up Reel-

There are some instances where the spring drive belt (8), see Figure 2 and exploded view, stretches after a period of time. When this happens, the takeup torque will be insufficient to wind tape properly into the takeup reel. In this case, the belt should be replaced as follows:

1. Remove rear escutcheon (16) and rear escutcheon plate (20).

2. Remove unit from cabinet.

3. Loosen brake drum set screw (94).

4. Lift up reel pan and shaft and remove spring drive belt.

5. Install new belt.

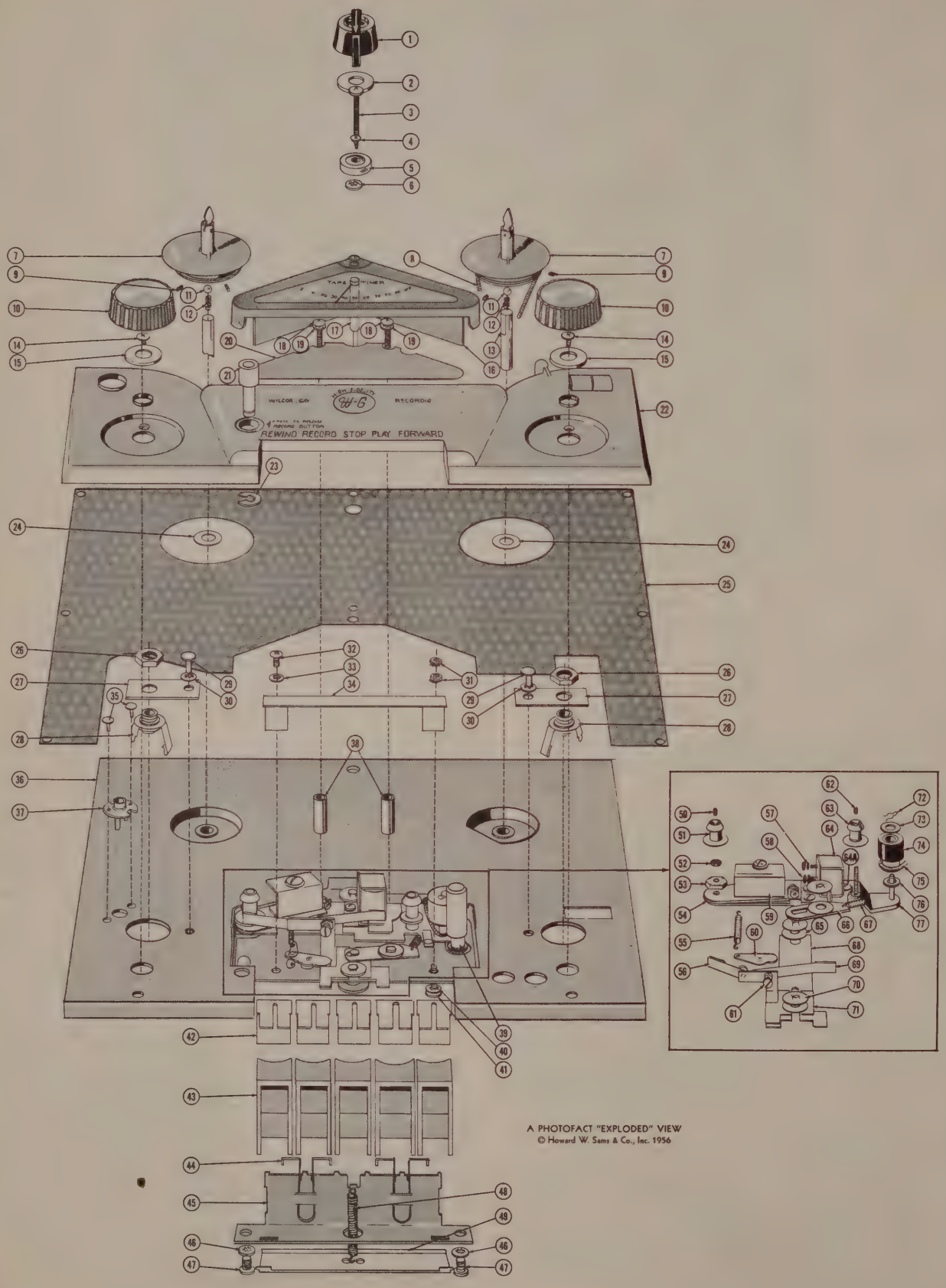


Figure 5A. Exploded View Of Parts Above Baseplate.

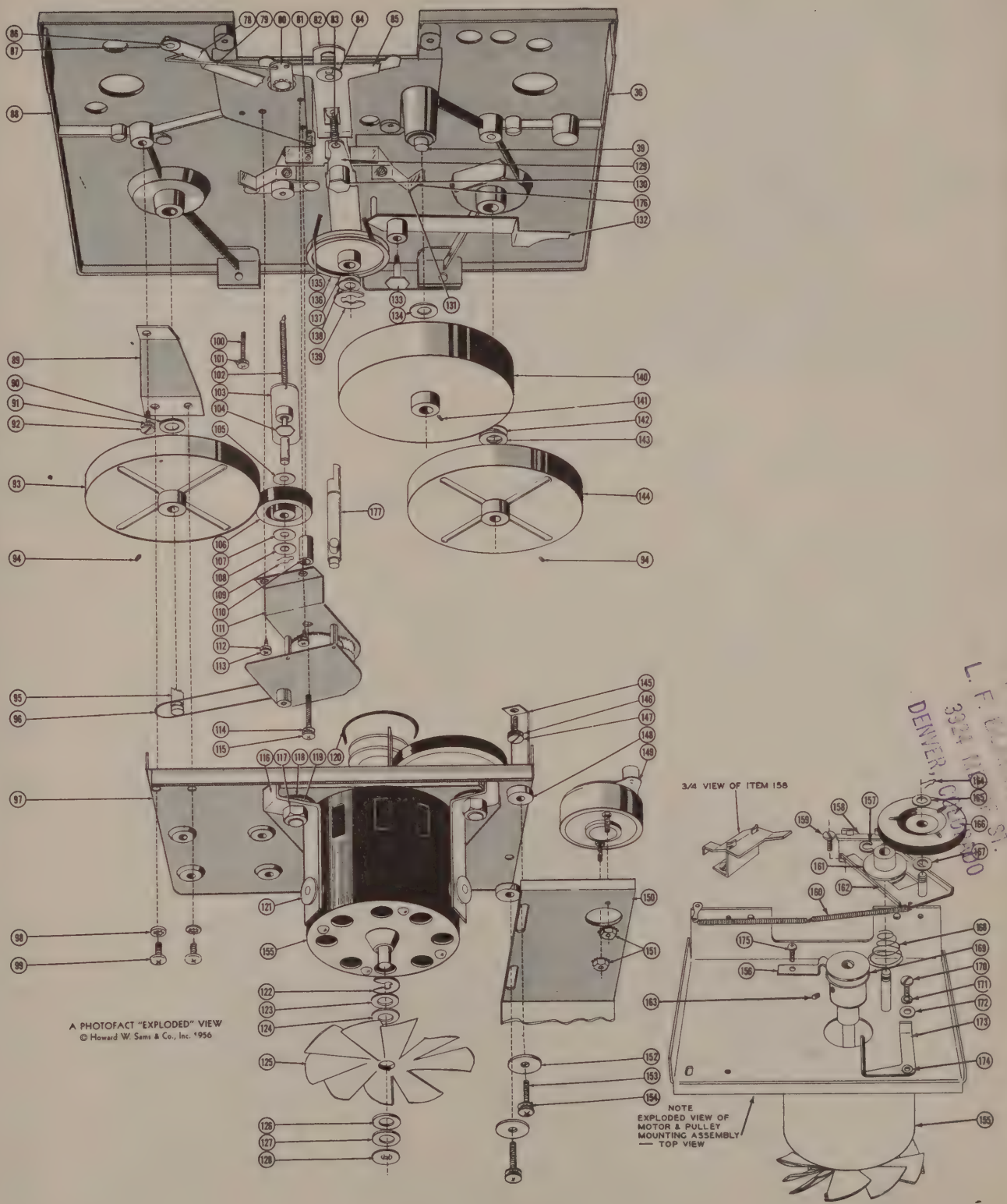
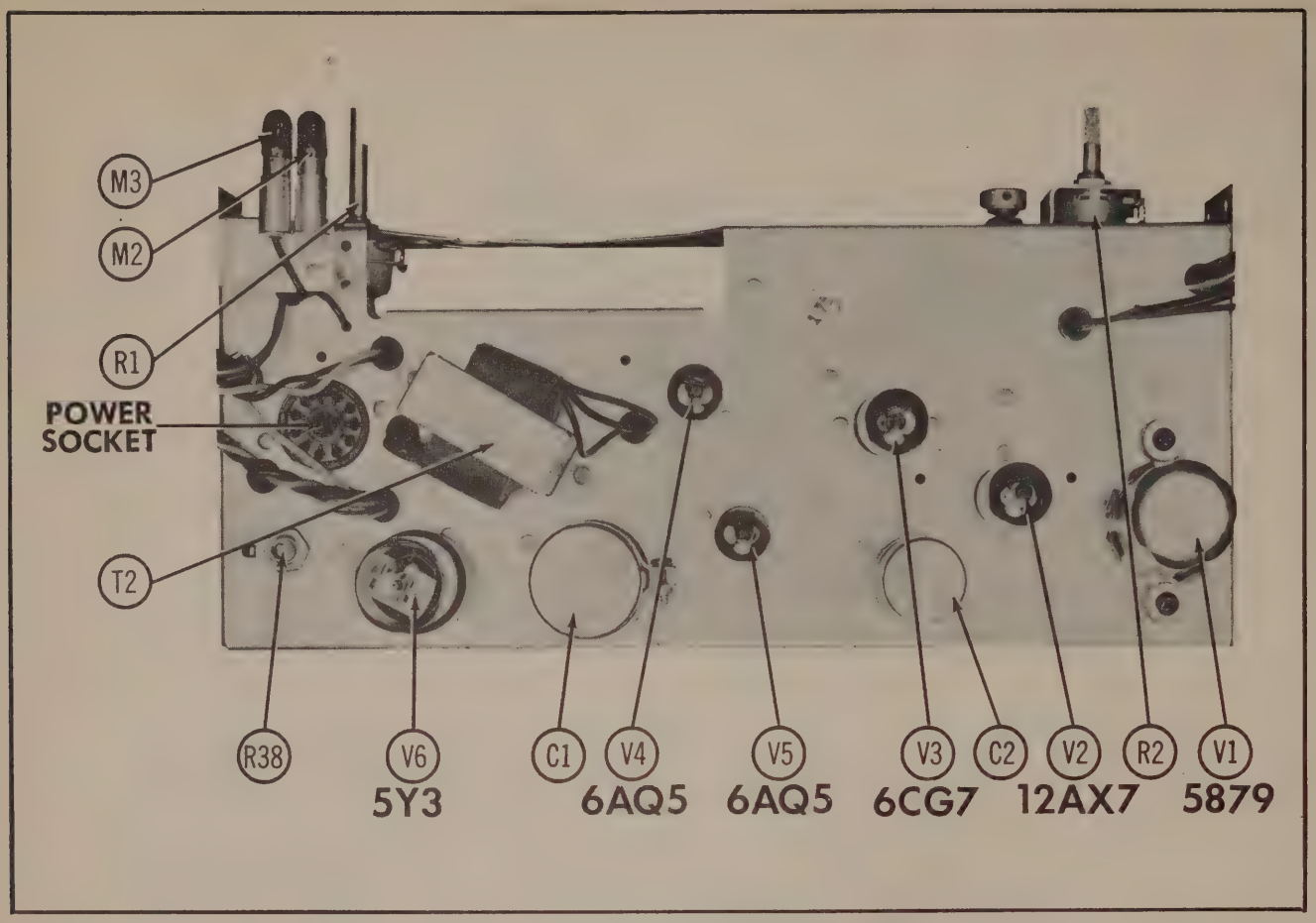
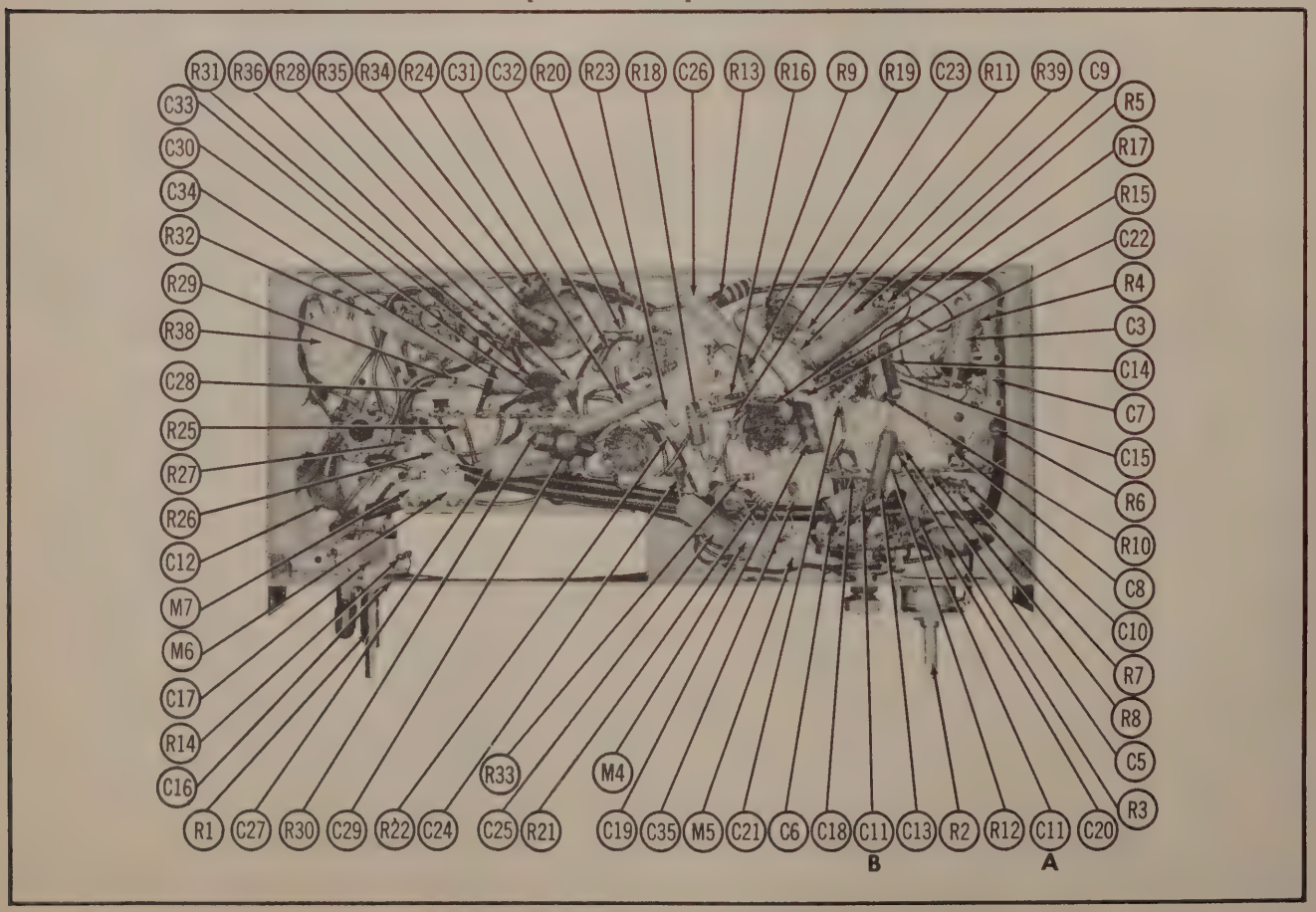


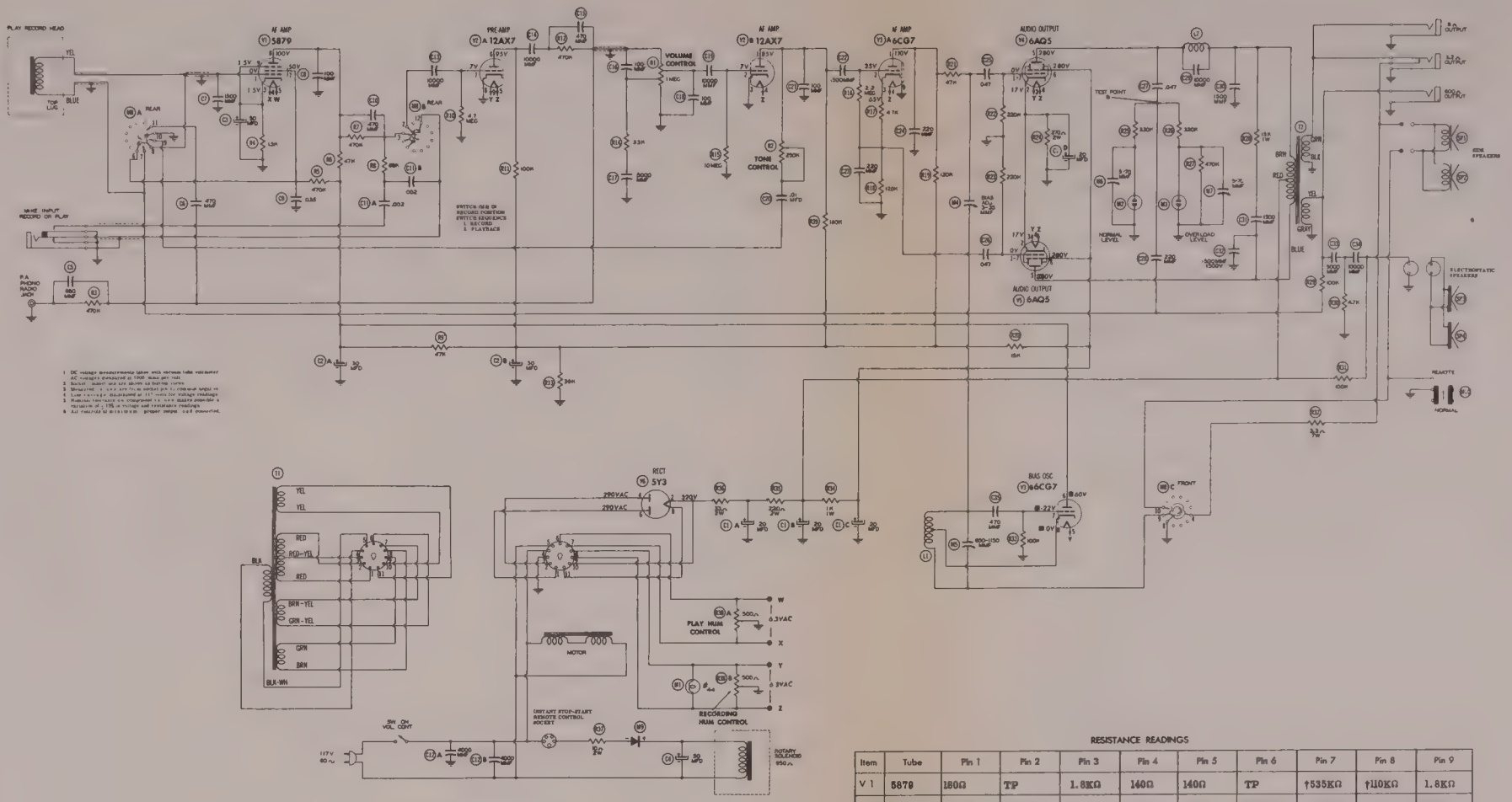
Figure 5B. Exploded View Of Parts Below Baseplate



Top View Of Amp. Chassis



Bottom View Of Amp. Chassis



1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket numbering as shown as bottom view.
3. Measured with no signal input and volume control at maximum setting.
4. Readings taken with instrument having 20,000 ohms per volt for voltage readings.
5. Readings taken with instrument ± 10% accurate prescribed variation of ± 15% in voltage and resistance readings.
6. All controls set to obtain proper output as indicated.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	180Ω	TP	1.8KΩ	140Ω	140Ω	TP	†535KΩ	†110KΩ	1.8KΩ
V 2	12AX7	†195KΩ	10Meg	0Ω	140Ω	140Ω	†115KΩ	4.7Meg	0Ω	140Ω
V 3	6CG7	†136KΩ	2.3Meg	125KΩ	140Ω	140Ω	■†63KΩ	■100KΩ	■15Ω	0Ω
V 4	6AQ5	220KΩ	270Ω	140Ω	140Ω	†520Ω	†1.25KΩ	[illegible]		
V 5	6AQ5	220KΩ	270Ω	140Ω	140Ω	†500Ω	†1.25KΩ	[illegible]		
V 6	5Y3	NC	10KΩ	TP	100Ω	TP	110Ω	TP	10KΩ	

TP - TIE POINT
NC - NO CONNECTION
* 6.3VAC MEASURED ACROSS FILAMENTS
ALL MEASUREMENTS TAKEN IN PLAY POSITION UNLESS OTHERWISE NOTED.
† MEASURED FROM PIN 2 OF V6.
■ MEASURED IN RECORD-ERASE POSITION.

6. Replace brake drum on shaft making sure washers (143) are in place.

7. Set brake drum so that there is a slight up and down play in the shaft and tighten set screw (94).

Bias Adjustment-

Turn the recorder on and depress the "Record" button; use no tape. To determine if the bias is within satisfactory limits without dismantling the unit, merely connect a VTVM from the top lug of the recording head to chassis. If 75 to 100 volts are present no adjustment is necessary.

If the readings are outside of this range, proceed as follows:

1. Try new 5879, 6CG7, 6AQ5, 12AX7, and 5Y3.

2. If still not within range, remove the chassis shield. Adjust trimmer M5 for maximum reading then adjust trimmer M4 to obtain a reading of 90 volts. This provides the optimum in performance.

Neon Record Level Indicators-

The neon record indicator firing level adjustment is only required if a neon bulb is replaced. The two neon indicators are adjusted for correct firing level by means of two trimmer capacitors, one for each indicator.

To adjust indicators proceed as follows:

1. Turn recorder on and depress "Record" button.

2. Connect a short jumper lead across the bias oscillator coil, L1 (short out the coil to disable the oscillator).

3. Connect an audio oscillator, set at 1000 cycles, into the microphone input jack. Output of audio oscillator should be approximately .01 volt. (A1 volt output level may be used with a 100 to 1 reduction pad of resistors inserted between the audio oscillator and the microphone jack).

4. Connect probe of low capacity type AC VTVM to test point "B" (junction of two 330K resistors, R25 and R26 mounted on a terminal strip near the volume control).

5. Adjust volume control to obtain a reading of 36 volts on VTVM and leave control set and VTVM connected.

6. Disconnect shorting jumper from across bias oscillator coil.

7. Adjust "Normal" indicator trimmer M6 fully clockwise and then turn slowly counterclockwise so that upon loosening the trimmer the "Normal" bulb barely lights. This adjustment must be made loosening the trimmer.

8. Short out the bias oscillator coil.

9. Increase volume control to obtain a reading of 88 volts on the VTVM.

10. Remove short from bias oscillator coil.

11. Adjust "Overload" indicator trimmer M7 as described in step "7" for just barely lighting the "Overload" indicator bulb.

IMPORTANT: Do not readjust the recording bias oscillator after setting the indicator light adjustments.

TROUBLES

Push Buttons Fail To Latch Into Position-

1. Lock plate spring (48) loose or broken, resulting in the lock plate not being held against the hinge bracket (45).

Fails To Erase-

1. Spring (55) loose or broken, result in the erase head (59) not being pulled forward to engage the tape.

2. Erase head not aligned properly. See "Erase Head Adjustment".

No Fast Forward Or Reverse-

1. Idler lever tension spring (83) may be loose or broken; if so, idler lever (129) will not be actuated .

2. Check idler drive belt (135) to see if it is properly connected.

No Drive On Record Or Playback-

1. Idler tension springs (160) loose or broken, thereby not holding idler wheel (166) in engagement with motor pulley (147) and flywheel (140).

2. Idler slide plate (162) binding on slide bushing (161), thus preventing idler wheel (166) from moving forward.

Tape Fails To Wind On Take-Up Reel During Record Or Playback-

1. Reel drive spring (8) loose or broken. See "Adjustment For Slow Take-Up Reel".

2. Brake drum shaft (13) binding. Clean foreign matter for bearing surface.

Speed Variation Or "Wow"-

1. Check the capstan (39), pinch roller (74), idler wheel (166), motor pulley (169), and flywheel (140) for oil or foreign material on their driving surfaces . Clean these parts with a good cleaning fluid.

2. Check motor pulley (169) to see if it is secured to motor shaft.

3. Check idler tension springs (160); see if they are holding idler wheel (166) in firm contact with motor pulley (169) and flywheel (140).

4. Idler slide plate (162) binding on slide bushing (161), preventing idler wheel (166) from making positive contact with the motor pulley and flywheel.

Tape Overruns Or Spills When Stop Button Is Depressed During Fast Forward Or Rewind-

1. Brake shoes out of adjustment. See "Brake Shoe Adjustment".

2. Brake pads worn out. Replace pads.

Fails To Record-

1. Tape pressure pad not adjusted properly, resulting in the tape not being held against the recording head. See "Pressure Pad Adjustment".

2. Record Head (64) loose on its mounting. Adjust head and tighten into position as described under "Record Play Head Adjustment".

3. Check the recording tape to see if the dull coated side faces inward on the reel. If the dull side faces outward a recording cannot be made.

CLEANING

The record head (64), capstan (39), and pressure roller (74) are subject to an accumulation of tape coating residue which is worn off the tape as it passes these parts. Use a soft cloth and alcohol to clean the head surfaces, capstan and pressure roller.

CAUTION: Do not use a brush or any metal object when cleaning the recording head as this could mar the metal pole piece.

LUBRICATION

All rotating parts are provided with generous size oilite bearings, which are factory lubricated and require no further attention.

An occasional cleaning out of foreign matter under the plastic pushbutton cover is desirable, and a small drop of oil on the sliding lever members is advisable.

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	69-2222	5879 AF Amp.	C11B		Cap. Disc, 2000MMF
V2	69-2175	12AX7 Mic. Pre-Amp. AF Amp.	C12A	B-4. 131-1	Cap. Disc, 4000MMF
V3	69-2238	6CG7 Bias Osc. -AF Amp.	C12B		Cap. Disc, 4000MMF
V4	69-2171	6AQ5 Audio Output	C13	C-4. 109-33	Cap. Ceramic, 10000MMF
V5	69-2171	6AQ5 Audio Output	C14	C-4. 109-33	Cap. Ceramic, 10000MMF
V6	69-2227	5Y3 Rectifier	C15	C-4. 109-2	Cap. Ceramic, 470MMF
C1A	C-5. 421-7	Elect. Cap. , 20MFD. @450V.	C16	C-4. 109-10	Cap. Ceramic, 100MMF
C1B		Elect. Cap. , 20MFD. @450V.	C17	C-4. 115-1	Cap. Disc, 5000MMF
C1C		Elect. Cap. , 20MFD. @450V.	C18	C-4. 109-10	Cap. Ceramic, 100MMF
C1D		Elect. Cap. , 20MFD. @25V.	C19	C-4. 109-32	Cap. Ceramic, 10000MMF
C2A	B-5. 437	Elect. Cap. , 30MFD. @250V.	C20	D-3. 100-7	Cap. Paper, . 01MFD. @400V.
C2B		Elect. Cap. , 30MFD. @250V.	C21	C-4. 109-10	Cap. Ceramic, 100MMF
C2C		Elect. Cap. , 30MFD. @25V. This section not used)	C22	C-4. 109-13	Cap. Ceramic, 1500MMF
			C23	C-4. 109-27	Cap. Ceramic, 220MMF
C3	B-5. 448	Elect. Cap. , 50MFD. @6V.	C24	C-4. 109-27	Cap. Ceramic, 220MMF
C4	5. 447	Elect. Cap. , 50MFD. @150V.	C25	D-3. 100-61	Cap. Paper, . 047MFD. @600V.
C5	C-4. 109-5	Cap. Ceramic, 680MMF	C26	D-3. 100-61	Cap. Paper, . 047MFD. @600V.
C6	C-4. 109-2	Cap. Ceramic, 470MMF	C27	D-3. 100-18	Cap. Paper, . 05MFD. @600V. (Some Models Use A . 047MFD. Cap In This Application Part #D-3. 100-61
C7	C-4. 109-13	Cap. Ceramic, 1500MMF			
C8	C-4. 109-10	Cap. Ceramic, 100MMF			
C9	D-3. 100-46	Cap. Paper, . 035MFD. @600V.	C28	D-4. 104-52	Cap. Mica, 220MMF @ 500V.
C10	C-4. 109-2	Cap. Ceramic, 470MMF	C29	C-4. 109-36	Cap. Ceramic, 1000MMF
C11A	B-4. 131-3	Cap. Disc, 2000MMF	C30	B-4. 129-7	Cap. Disc, 1500MMF @ 1500V.

ELECTRICAL PARTS LIST-Con't.

Ref. No.	Part No.	Description
C31	C-4.109-13	Cap. Ceramic, 1500MMF
C32	B-4.129-7	Cap. Disc, 1500MMF @ 1500V.
C33	C-4.115-1	Cap. Disc, 5000MMF
C34	C-4.109-33	Cap. Ceramic, 10000MMF
C35	C-4.109-2	Cap. Ceramic, 470MMF
R1	C-8.227-5	Volume Cont. & Switch, 1Meg
R2	C-8.231-2	Tone Cont., 250K
R3	D-7.101-128	Resistor, 470K, 1/2 W, 10%
R4	D-7.101-23	Resistor, 1.5K, 1/2 W. 10% (Some Models Use A 1.8K Resistor In This Application)
R5	D-7.101-128	Resistor, 470K, 1/2 W, 10%
R6	D-7.102-94	Resistor, 47K, 1W. 10%
R7	D-7.101-128	Resistor, 470K, 1/2 W, 10%
R8	D-7.101-93	Resistor, 68K, 1/2 W, 10%
R9	D-7.101-86	Resistor, 47K, 1/2 W, 10%
R10	D-7.101-178	Resistor, 4.7Meg, 1/2 W, 10%
R11	D-7.101-100	Resistor, 100K, 1/2 W, 10%
R12	D-7.101-128	Resistor, 470K, 1/2 W, 10%
R13	D-7.103-153	Resistor, 39K, 2W, 10%
R14	D-7.101-79	Resistor, 33K, 1/2 W, 10%
R15	D-7.101-192	Resistor, 10Meg, 1/2 W, 10%
R16	D-7.101-155	Resistor, 2.2Meg, 1/2 W, 10%
R17	D-7.101-44	Resistor, 4.7K, 1/2 W, 10%
R18	D-7.102-112	Resistor, 120K, 1W, 10%
R19	D-7.102-112	Resistor, 120K, 1W, 10%
R20	D-7.102-72	Resistor, 15K, 1W, 10%
R21	D-7.101-86	Resistor, 47K, 1/2 W, 10%
R22	D-7.101-114	Resistor, 220K, 1/2 W, 10%
R23	D-7.101-114	Resistor, 220K, 1/2 W, 10%
R24	D-7.103-62	Resistor, 270KΩ, 2W, 10%
R25	D-7.101-121	Resistor, 330K, 1/2 W, 10%
R26	D-7.101-121	Resistor, 330K, 1/2 W, 10%
R27	D-7.101-128	Resistor, 470K, 1/2 W, 10%
R28	D-7.102-72	Resistor, 15K, 1/2 W, 10%
R29	D-7.101-100	Resistor, 100K, 1/2 W, 10%
R30	D-7.101-44	Resistor, 4.7K, 1/2 W, 10%
R31	D-7.101-100	Resistor, 100K, 1/2 W, 10%
R32	C-6.215-10	Resistor, 3.3Ω, 7W, 10%
R33	D-7.101-100	Resistor, 100K, 1/2 W, 10%
R34	D-7.102-23	Resistor, 1K, 1W, 10%
R35	D-7.103-58	Resistor, 220Ω, 2W, 10%
R36	7.103-23	Resistor, 33Ω, 2W, 10%
R37	7.102-217	Resistor, 10Ω, 2W, 20%
R38A	B-8.234	Recording Hum Control 500ΩPot.
R38B	B-8.234	Play Hum Control 500Ω Pot.
R39	D-7.101-111	Resistor, 180K, 1/2 W, 10%
T1	D-9.278-0	Power Trans.
T2	C-9.277A	Push-pull Output Trans.
SP1	30.341-2	5 x 7 P. M. Speaker
SP2	30.341-2	5 x 7 P. M. Speaker
SP3	30.347	Electrostatic Speaker
SP4	30.347	Electrostatic Speaker
L1	B-1.557	Osc. Coil R. F. (Tapped)
L2	B-1.556	Bias Freq. Load Coil
M1	45-2003	Pilot Lamp #44
M2	45-2036-0	Neon Lamp NE51Normal Indicator
M3	45-2036-0	Neon Lamp NE51 Overload Indicator
M4	C-4.142	Trimmer Bias Adj. (3-35MMF)
M5	C-4.142	Trimmer, Bias Osc. Freq. Adj. (850-1150MMF)
M6	B-4.145	Trimmer Normal Ind. (5-70 MMF)
M7	B-4.145	Trimmer Overload Ind. (5-70 MMF)
M8A	11.239	Play Record Sw. (Rear View)
M8B		Play Record Sw. (Rear View)
M8C		Play Record Sw. (Front View)
M9	33.461	Selenium Rectifier (250MA)
M10	11-2233	Remote-Normal Switch

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	C-13.253-7	Speed Shift Knob (Black)
2	73-2254-3	Felt Washer
3	57-6C-620-1	#6-32 x 1 1/4"R. H. M. S. Phillips
4	57-4C-405-7	#4-40 x 5/16"O. H. M. S. Phillips
5	B-32.302-2	Timer Knob (Crome plated)
6	73-2231-3	#4 Internal Lockwasher Stl.C. P.
7	35.887	Reel Pan Assy-Includes Items 9-11-12-13
8	B-31.351	Reel Drive Spring (Belt)
9	57-3589-1	6-32 x 3/16" Bristol Hd. Set Screw
10	C-13.312	Control Knob(Black & Chrome)
11	33.458	3/16 Dia. Stl. Ball
12	B-31.359	Compression Spring
13	B-32.315	Brake Drum Shaft (Take-up Reel)
14	57-46C-806-1	#8-32 x 3/8R. H. M. S.Phillips
15	73-2254-3	Felt Washer
16	D-13.292-4	Rear Escutcheon (Black)
17	35.851	Timer Shaft & Pointer Assy.
18	57-1C-618-1	#6-32 x 1 1/8Phillips R. H. M. S.
19	73-2334-1	#6 Cantlink Washer
20	B-19.975-2	Rear Escutcheon Plate (Black)
21	B-32.308-4	Record Lock Button
22	E-13.293-4	Front Escutcheon (Black)
23	33.415	"E" Ring Retainer
24	28.163	Linen Washer
25	D-31.363	Baseplate Overlay
26	48-2213-1	Hex. Nut, 3/8-32 x 1/2
27	B-19.985-1	Bracket for Input Jack
28	B-33.878	Midget Jack
29	54-2030-35	Drilled Rivet 1/4 x .122 x 7/32
30	73-2231-5	#8Int. Lockwasher
31	48-2219-1	Keps 6-32 x 5/16 Hex. Nut & Ext. Lockwasher
32	57-1C-603-2	#6-32 x 3/16B. H. M. S. Brz. Phillips
33	73-2334-1	#6 Cantlink Washer
34	B-19.858	Push Button Retainer Bracket
35	54-2030-35	Drilled Rivet 1/4 x .122 x 7/32
36	D-35.861-4	Base Plate Assy. (Dull Blk.)
37	B-33.459	Phono Jack
38	B-33.446	Spacer
39	B-32.259-1	Capstan Shaft (To be used on 60 cy. units)
	B-32.285-1	Capstan Shaft (To be used on 50 cy. units)
40	73-2231-4	#6Internal Lockwasher
41	57-1C-608-1	#6-32 x 1/2Phillips B. H. M. S.
42	B-19.876	Push Button Lever
43	35.869-1	Push Button Assy.
44	B-31.337	Push Button Return Spring
45	B-19.859-1	Hinge Bracket for Push Button
46	73-2241-154	Flat Washer 5/16O. D. X. x .144 x .025
47	57-46C-806-1	#8-32 x 3/8 R. H. M. S.

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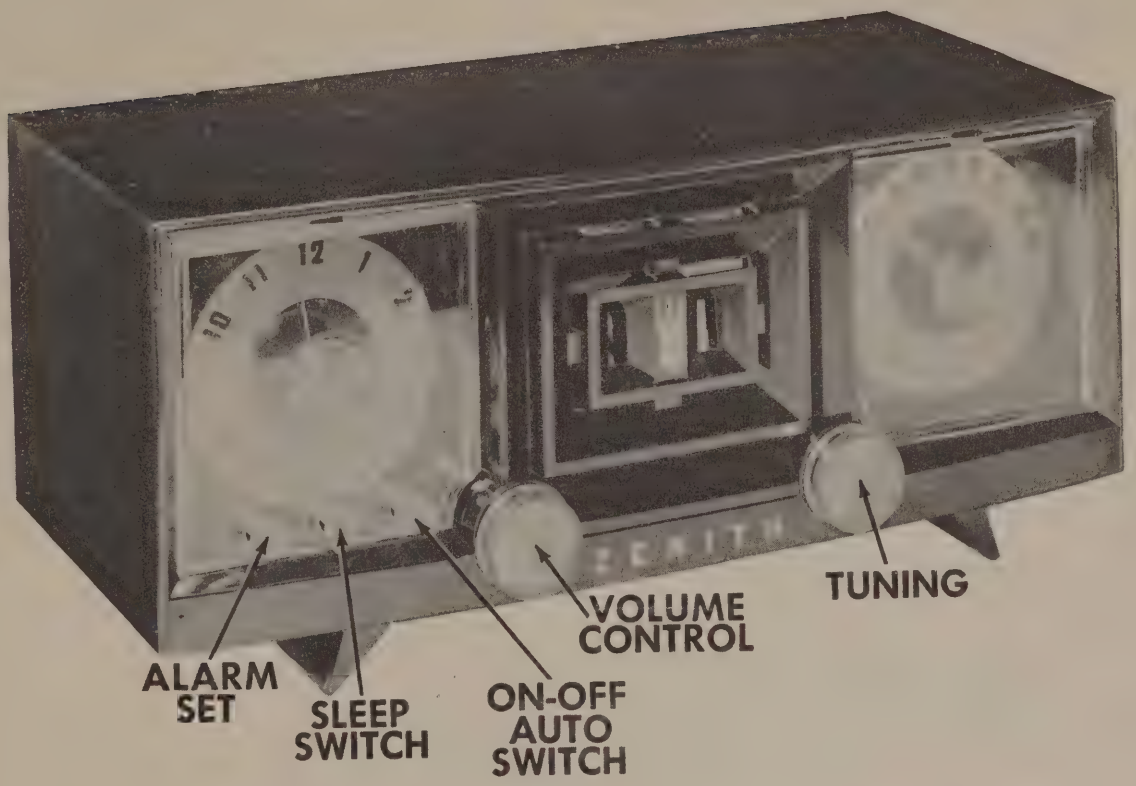
MECHANICAL PARTS LIST-Con't

Ref. No.	Part No.	Description
48	B-31.343	Lock Plate Spring
49	B-19.870A	Locking Plate for Push Buttons
50	57-3439-0	#6-32 x 3/16Bristol Head Set Screw
51	B-32.300	Tape Guide Post (Left)
52	48-410-1	#6-32 Nut Steel
53	B-32.260	Tape Guide Post Spacer
54	B-35.794	Erase Head Plate Includes Item 59
55	B-31.361	Erase Head Tension Spring
56	B-35.764	Pressure Pad (Felt)2 used
57	73-2233-1	Int. Lockwasher
58	48-2216-1	#2-56 x 3/16 Hex. Nut
59	C35.756A	Erase Head
60	B-35.882	Record Actuating Lever Assy.
61	57-16C-606-1	#6-32 x 3/8R. H. M. S.
62	57-3439-0	#6-32 x 3/16Bristol Head Set Screw
63	B-32.309	Tape Guide Post (Right)
64	C-36.156-1	Tape Recording Head (Shure TR16H)
65	73-2241-148F	Flat Washer
66	B-19.881	Playback Actuating Lever
67	B-31.360	Pinch Roller Tension Spring
68	C-35.758	Playback Slide Plate Assy.
69	B-35.764	Pressure Pad Spring Assy.
70	B-33.412	Push-On-Stud Nut, 3/16"Stud
71	B-19.868A	Record Slide Plate
72	B-33.409	Hairpin Clip
73	73-2340	Linen Washer
74	B-33.404	Pinch Roller
75	B-31.351	Reel Drive Spring (Belt)
76	73-2340	Linen Washer
77	B-35.871	Pinch Roller Plate Assy.
78	B-35.774	Record Interlock Assembly
79	B-31.333	Switch Arm Link
80	110-48B	Switch Lever Assy.
81	B-31.338	Brake Return Spring
82	C-35.835	Brake Slide Plate Assy.
83	B-31.339	Idler Lever Tension Spring
84	B-33.412	Push-On-Stud Nut, 3/16 Stud
85	B-33.759	Shift Plate Assembly
86	54-2030-35	Drilled Rivet 1/4 x .122 x 7/32
87	73-2241-18	Flat Washer
88		(Bottom View of Item 36)
89	B-19.863	Drive Mounting Plate Bracket
90	B-28.163	Linen Washer
91	73-2231-5	#8 Int. Lockwasher
92	57-11C-804-1	#8-32 x 1/4 R. H. M. S.
93	C-35-823-B	Brake Drum & Bushing Assy.
94	57-3589-1	#8-32 x 1/4Bristol Hd. Set Screw
95	B-32.316	Brake Drum Shaft (Grooved)
96	B-28.175	Counter Belt (Rubber)
97	D-35.753-3	Drive Mounting Plate Assy.
98	73-2231-5	Internal Lockwasher
99	57-2102-3	#8-32 x 1/4 R. H. M. S.
100		Screw
101		Washer
102	B-31.362	Sub-Idler Tension Spring
103	B-35.757	Sub-Idler Plate Assy.
104	B-32.275-1	#8-32 HH Shoulder Screw
105	73-2340	Linen Washer
106	B-33.405	Sub Idler Wheel
107	73-2254-6	Felt Washer
108	73-2241-150	Flat Washer
109	B-33.409	Hairpin Clip
110	B-33.118	Spacer
111	B-33.445	Gear Train for Tape Index
112	73-2231-4	#6Int. Lockwasher
113	57-1C-603-2	6-32 x 3/16B. H. M. S. Brz.
114	73-2231-4	#6Int. Lockwasher
115	57-1C-614-1	#6-32 x 7/8Phillips B. H. M. S.
116	B-19.995	Aux. Motor Bracket
117	48-2221	#10-32 Hex. Nut (Elastic Stop Nut)
118	B-28.159	Shock Mount
119	B-33.411	Flat Washer 3/4O.D. x 3/16
120	28.181	Idler Drive Belt
121	35-2018	Rubber Grommet
122	33.418	Truearc Retaining "E" ring
123	73-2241-143	Flat Washer
124	73-2254-3	Felt Washer
125	C-19.887-1	Fan Blade
126	73-2254-3	Felt Washer
127	73-2241-143	Flat Washer
128	33.415	Push-On-Fastener
129	35.834-2	Idler Lever Assy.
130	B-32.275-1E	#8-32 HH Shoulder Screw
131		Brake Spring (part of Item 82)
132	B-35.872	Lever Assembly
133	B.32.275-1	8-32 HH Shoulder Screw
134	B-23.163	Linen Washer
135	28.181	Idler Drive Belt (Part of 120)
136	B-33.406	Idler Drive Sheave
137	73-2254-6	Felt Washer
138	73-2241-150	Flat Washer, Blued Steel
139	B-33.418	Truarc Retaining "E" ring
140	B-13.257-1	Flywheel
141	57-3589-1	#8-32 x 1/4Bristol Head Set Screw
142	B-28.163	Linen Washer
143	B-28.163	Linen Washer
144	C-35.823-B	Brake Drum & Bushing Assy.
145	B-19.862	Angle Bracket for Mounting Drive Assy.
146	77-2231-5	Internal Lockwasher
147	57-2102-3	8-32 x 1/4R. H. M. S.
148	B-32.371-1	Spacer
149	33.457	Solenoid
150	35.873	Solenoid Plate (Includes Item 149)
151	48-2219-1	Keps 6-32 x 3/8Hex. Nut & Ext. Lockwasher
152	B-33.411	Flatwasher 3/4O.D. x 3/16 I.D.X.
153		Screw
154	73-2241-134	Flatwasher 5/16 O.D.X. 130 x .031
155	36.153	Motor, Round Type (Fasco)
156	B-19.961	Speed Control Shaft Detent Spring
157	B-33.407-1	"C" Washer
158	51-3182	Shift Plate for High Speed
159	57-2109-2	6-32 x 3/16Phillips B. H. M. S.
160	B-31.324	Idler Spring (Tension)
161	B-32.264	Idler Slide Bushing
162	B-35.768	Idler Slide Plate (Incl. Item 161)
163	57-3589-1	8-32 x 1/4Bristol Hd. Set Screw
164	B-33.409	Hairpin Clip
165	B-28.163	Linen Washer
166	B-33.408	Rubber Bonded Idler Wheel,
167	B-28.163	Linen Washer
168	B-31.327	Idler Lift Compression Spring
169	B-32.288	Motor Pulley
170	57-2102-3	8-32 x 1/4 R. H. M. S.
171	73-2231-5	#8 Internal Lockwasher
172	73-2241-143	Flat Washer
173	110-47	Idler Throw-Out Lever
174	B-32.291-1	Shoulder Washer
175	57-1C-603-2	#6-32 x 3/16Phillips B. H. M. S.
176	B-31.335A	Brake Pad, Felt
177	C-35.816-1	Speed Control Shaft Assy.

ZENITH MODELS X514V, W (Ch. 5X06), X519F, G, R, W (Ch. 5X07)

ZENITH MODELS X514V, W (Ch. 5X06), X519F, G, R, W (Ch. 5X07)



ZENITH MODELS X514V, W (Ch. 5X06), X519F, G, R, W (Ch. 5X07)

TRADE NAME	Zenith Models X514V, X514W (Ch. 5X06); X519F, X519G, X519R, X519W (Ch. 5X07)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400% Mod.)	600KC	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

ZENITH
MODEL X514V (Ch. 5X06)

PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC-AF Amp.	12AT6	12AT6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 40	150	22-2710	E92B12					D4612
B	■ 80	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200	22-829	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	50		† 105-38	† PA394	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C4A	5000		♦ 105-39	♦ PA395						
B	5000									
C	250									
D										
C5A	5000		105-40	PA396	DD-502	K080	811-005	DC-525	5HK-D5	
B	5000				DD-502	K080	811-005	DC-525	5HK-D5	
C	500				D6-501	TP47	GP2K-501	UC-535	5GA-T5	

† Items C3, R2A, R2B, and R2C are combined in one unit.
♦ Items C4A, C4B, C4C, C4D, R3A, R3B, and R3C are combined in one unit. When replacing items separately, C4C and C4D may total between 250-500MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-3596	AB-697	A47-1Meg-S	Q11-137	U-54	Volume-See Note 1
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.

Note 1. Part No. 63-3597 used in chassis 5X06.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	ZENITH PART No.	IRC PART No.	NOTES
R2A	22KΩ		† 105-38	BTS-22K	
B	70Ω			BTS-68	
C	2.2Meg			BTS-2.2Meg	

ITEM No.	RATING: OHMS	RATING: WATT	ZENITH PART No.	IRC PART No.	NOTES
R3A	4.7Meg		♦ 105-39	BTS-4.7Meg	
B	470KΩ			BTS-470K	
C	470KΩ			BTS-470K	
R4	150Ω	½	63-1750	BTS-150	
R5	1000Ω	1	63-965	BTA-1000	

† Items R2A, R2B, R2C, C3 are combined in one unit.
♦ Items R3A, R3B, R3C, C4A, C4B, C4C, C4D are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.5KΩ	3-4Ω	95-1455	Z1103 ①	A3031 ①	A-3336 ①	24S50 ①	S-16X ①	① Bend ears down.

SPEAKER

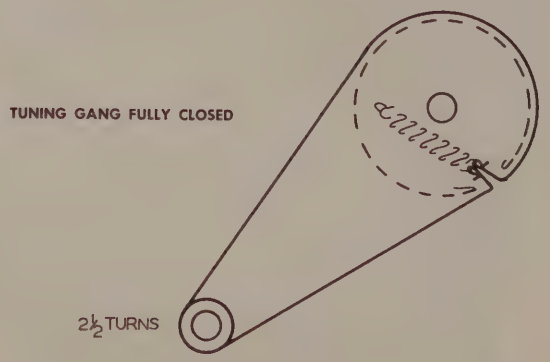
ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	ZENITH PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	3-4Ω	49-786	4A07	223S1	

COILS (RF-IF)

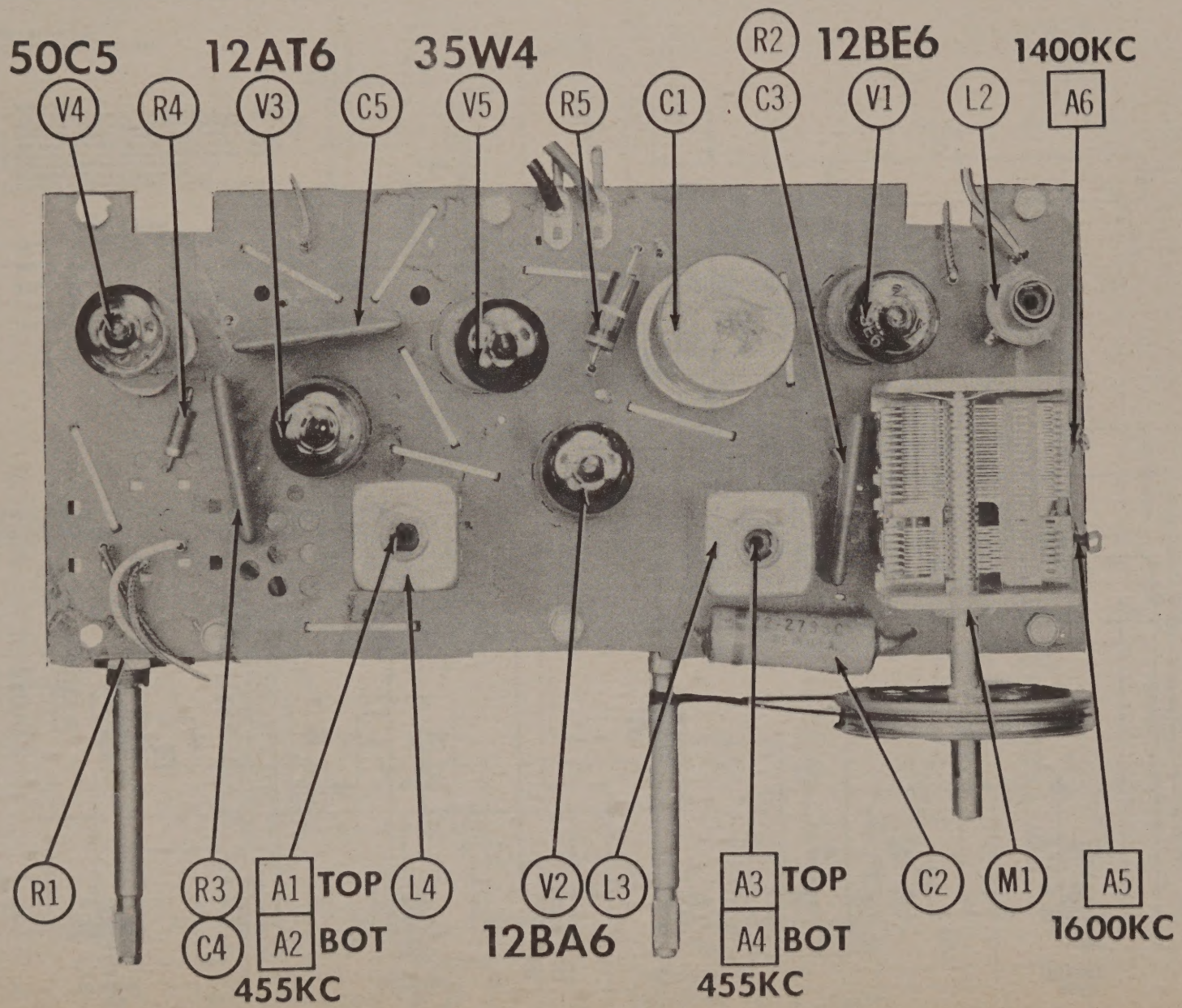
ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	3.3Ω		S-23570				
L2	Osc. Coil	.6Ω	6.3Ω	S-21776				Includes Cabinet Back Core Part No. 149-85
L3	Input IF	20Ω	20Ω	95-1438	16-6780		13-PC1	
L4	Output IF	20Ω	20Ω	95-1439				

MISCELLANEOUS

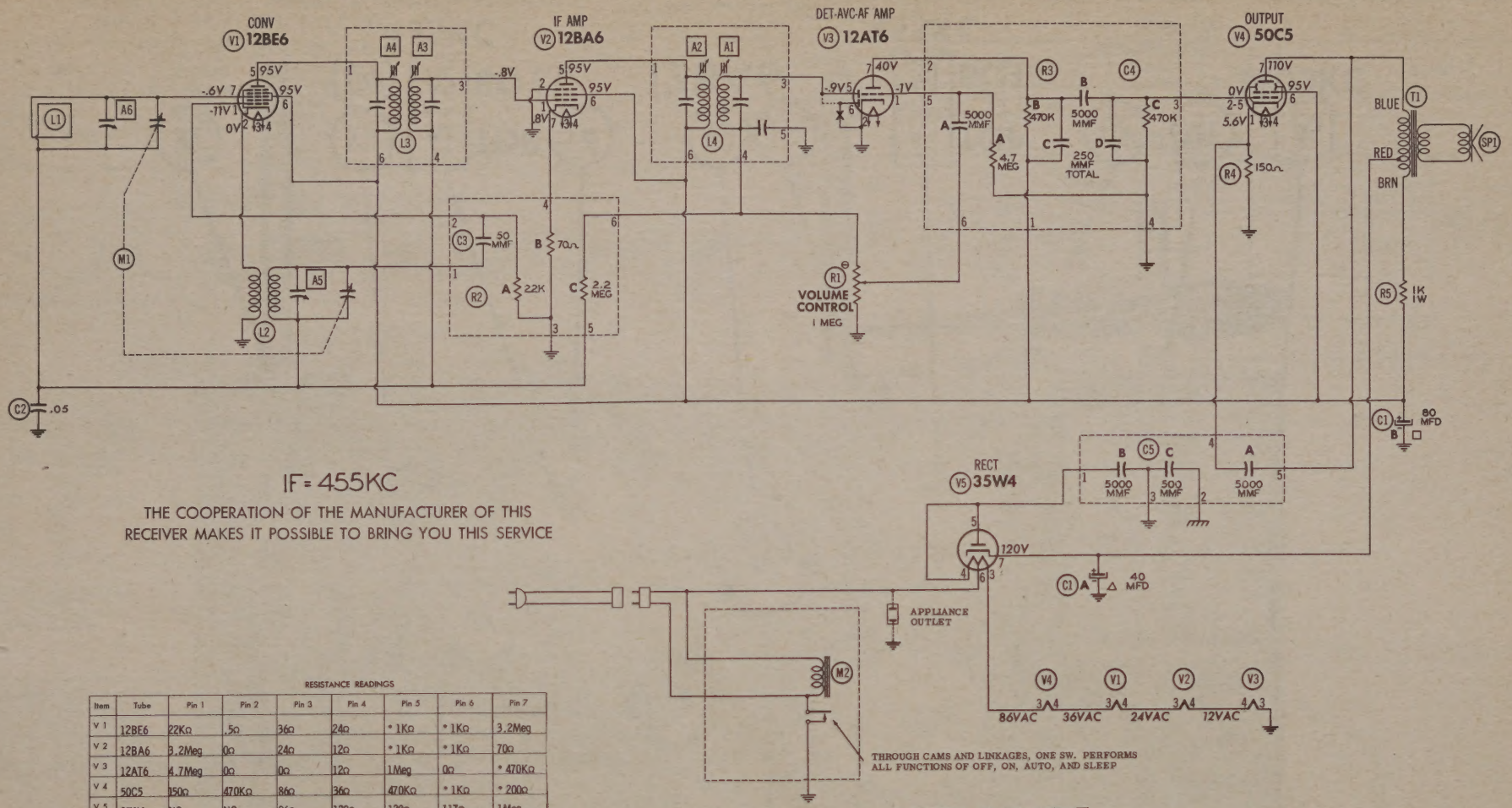
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M1	Tuning Cap.	22-2709	2 Gang
M2	Clock	S-23572	Chassis 5X07
	Cabinet	14-1775	Model X514
	Cabinet	14-1776	Model X514W
	Cabinet	14-1778	Model X514V
	Cabinet	14-1711 or 14-1781	Model X519R
	Cabinet	14-1712 or 14-1782	Model X519W
	Cabinet	14-1713 or 14-1783	Model X519G
	Cabinet	14-1714 or 14-1784	Model X519F
	Knob	46-1307	Volume & Tuning
	Knob	46-1312	Clock (3 used) Chassis 5X07
	Knob	46-1363	Clock-Chassis 5X06
	Dial Scale	26-548	Chassis-5X07
	Dial Scale	26-550	Chassis -5X06
	Dial Pointer	59-304	Chassis-5X07
	Dial Pointer	59-311	Model X514
	Dial Pointer	59-312	Models X514V, W
	Dial Crystal	192-208	Radio-Chassis 5X07
	Dial Crystal	192-210	Clock-Chassis 5X07
	Crystal	192-202	Clock-Chassis 5X06



DIAL CORD STRINGING



CHASSIS TOP VIEW



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	36Ω	24Ω	* 1KΩ	* 1KΩ	3.2Meg
V 2	12BA6	3.2Meg	0Ω	24Ω	12Ω	* 1KΩ	* 1KΩ	70Ω
V 3	12AT6	4.7Meg	0Ω	0Ω	12Ω	1Meg	0Ω	* 470KΩ
V 4	50C5	150Ω	470KΩ	86Ω	36Ω	470KΩ	* 1KΩ	* 200Ω
V 5	35W4	NC	NC	86Ω	120Ω	120Ω	117Ω	1Meg

* MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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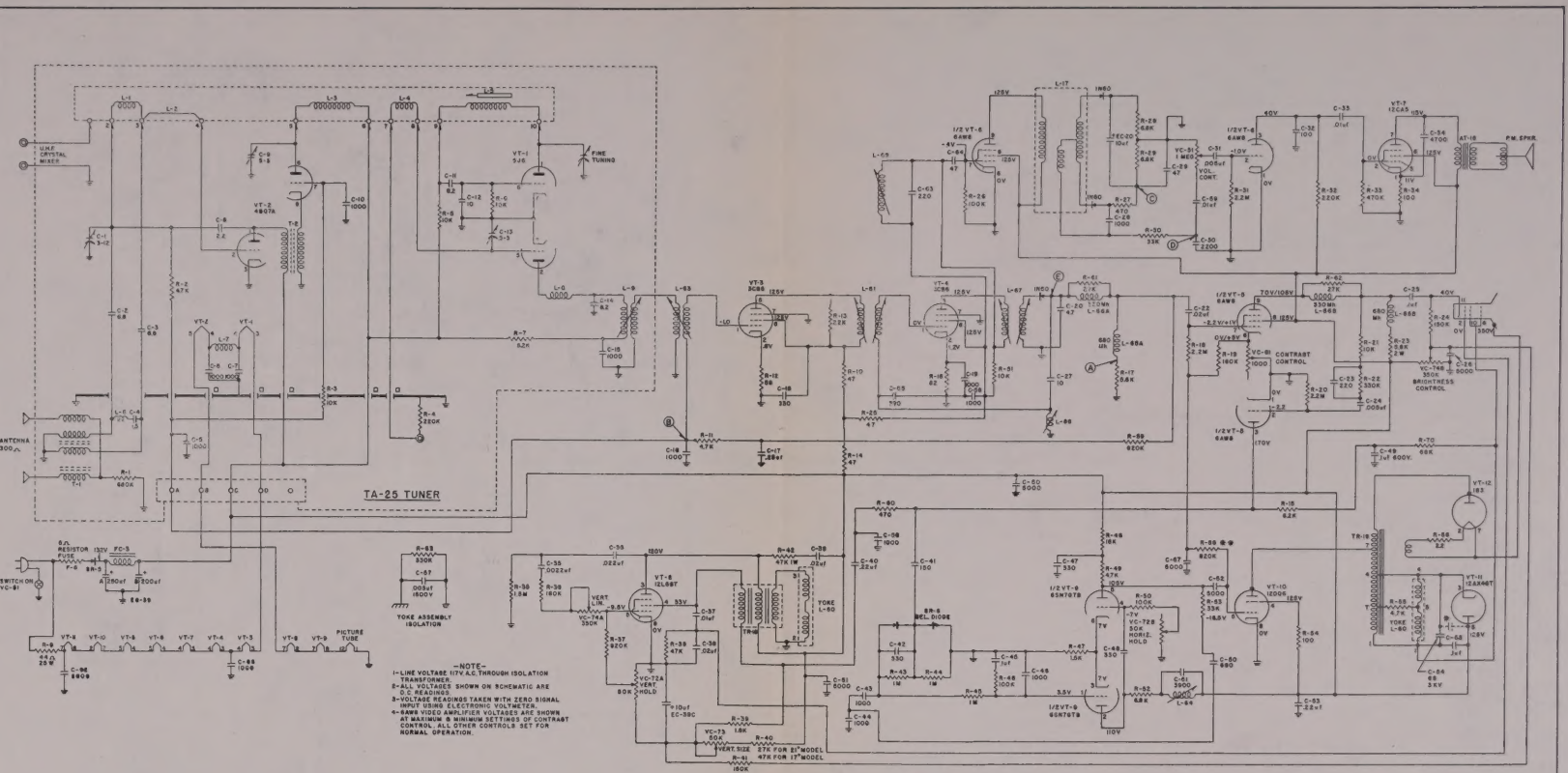
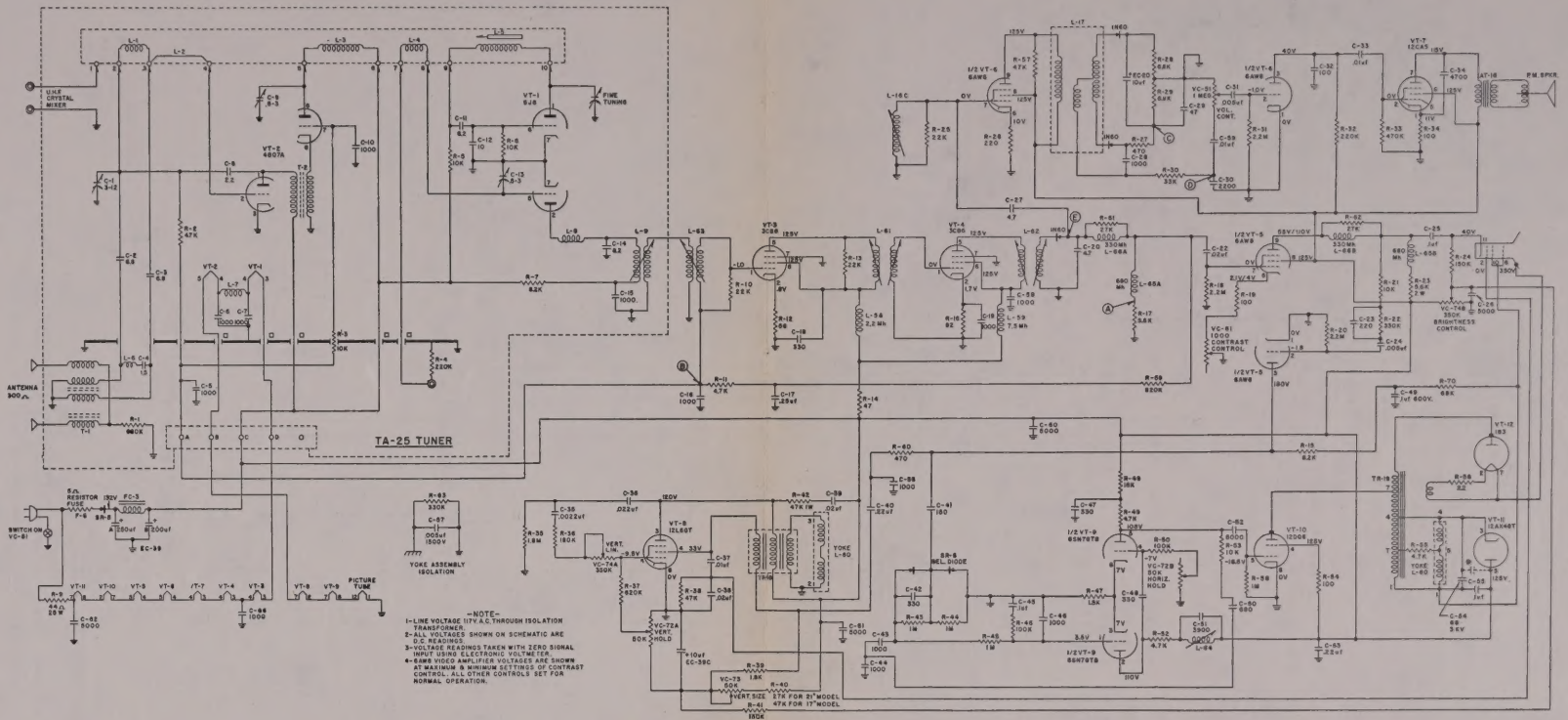


TRAV-LER MODELS

	Chassis
517-106	(520B5, 520BD5)
517-107	(520B5, 520BD5)
521-111	(520B5, 520BD5)
521-112	(520B5, 520BD5)

Schematic Courtesy TRAV-LER Radio Corp.

TRAV-LER



TRAV-LER MODELS

517-106 (Ch. 520A5)
517-107 (Ch. 520A5)
521-111 (Ch. 520A5)
521-112 (Ch. 520A5)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

Schematic Courtesy TRAV-LER Radio Corp.

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